UNISYS

BTOS II

Installation and Configuration

Reference Manual

Relative to Release Level 3.0

Priced Item

June 1989
Distribution Code
Printed in U S America
5030414

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About This Manual

This manual contains information about the installation and configuration of the standard software for B24, B26, B27, B28, B38, and B39 workstations and the XE master.

Who Should Use This Manual

This manual is intended for the person who installs, configures, and maintains workstation software or XE master software. Information in this manual addresses several operator levels: the user who has little or no previous experience with operating systems, the system administrator who installs and sets up the system, and the programmer or system administrator who wants to use the more complex features of BTOS II.

How To Use This Manual

You do not need to read this manual from cover to cover. It contains information on many aspects of both workstations and the XE master, and you may be interested in only some of them at this time.

If you are familiarizing yourself with workstation or XE master software installation and configuration requirements, you should read the brief overview in section 1.

In addition, if you look over the table of contents to review the topics before you start, you may find this manual easier to use.

To locate detailed information, refer to the alphabetic index of topics at the back of this manual.

How This Manual is Arranged

The material in this manual is divided into nine sections, four appendixes, a table of contents, a glossary of terms, and an index.

- Section 1 gives an overview of workstation and XE master software installation procedures, including a description of the release media and the types of system the software can be installed on. Inexperienced BTOS users can use this section.
- Section 2 provides standard software installation procedures for workstations. It also includes procedures to deinstall software. Inexperienced BTOS users can use this section.
- Section 3 provides configuration procedures for the master workstation. It describes the configuration files used on a workstation and explains how to create, modify, or use them. Experienced BTOS users can use this section.
- Section 4 describes methods to optimize workstation performance by using initialization files; reducing disk intensity; and improving file access, system communications, and print scheduling. It also provides backup and restoration procedures. Advanced BTOS users can use this section.
- Section 5 provides software installation procedures for the XE master. It describes how to use tapes and tape drives, describes the XE master hardware, and includes information on powering the XE master up and down and installing workstation software on it. Inexperienced BTOS users can use this section.
- Section 6 provides configuration procedures for the XE master. It describes the configuration files that are used on the XE master, then describes how to create, modify, or use the files. Experienced BTOS users can use this section.
- Section 7 presents methods to optimize XE master performance by using initialization files and system services. It also provides backup and restoration procedures. Advanced BTOS users can use this section.
- Section 8 is applicable to both workstations and the XE master. It presents procedures for configuring either system for printing. Experienced BTOS users can use this section.

- Section 9 is applicable to both workstations and the XE master. It provides information for configuring a cluster. Experienced BTOS users can use this section.
- Appendix A describes simple troubleshooting procedures for installation and configuration problems.
- Appendix B lists error messages that can occur during software installation.
- Appendix C explains IVOLUME parameters. You use the IVOLUME command to initialize your hard disk.
- Appendix D provides a table of default system configuration files that are installed on hard disk during XE master software installation.

Conventions

The following conventions apply to this manual:

- XE master refers to the XE520 system.
- XEBTOS refers to the XE520 operating system
- Processor board names refer to both the standard board and the X–Board. For example, CP refers to both CP and CP–X.
- The term "BTOS workstations" refers to the Unisys B24, B26, B27, B28, B38, and B39 workstations only.
- When two keys are used together for an operation, they are hyphenated. For example, **CODE–MARK** means that while you hold down **CODE**, you press **MARK**.
- Character refers to the alphanumeric symbols and the spaces you enter by pressing the **Spacebar**.
- BTOS refers to BTOS II except where noted.

Related Product Information

Refer to the following product information for more information about the XE master or workstation operating systems.

- *XE520 System Capabilities Overview*
- *XE500 BTOS Operations Manual*
- *BTOS II Standard Software Operations Manual*
- *BTOS II Standard Software Operations Quick Reference Manual*
- *BTOS II System Reference Manual*
- *BTOS II Language Development Programming Guide*
- *BTOS II Debugger Programming Guide*
- *BTOS II System Status Codes Reference Manual*
- *BTOS II Protected Mode Programming Guide*

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BTOS II Software Installation Overview

This section describes:

- new features of the software release
- the software and hardware
- the software media and the type of hardware it can be installed on
- the overall tasks involved in the installation and configuration of BTOS II
- memory and disk space requirements

This section directs you to other sections within this manual that provide detailed information on installing the software or configuring your system.

New Features

The following are new or upgraded features in this release:

- packaging titles for:
  - Basic Operating System
  - Real Mode/Protected Mode Cluster Operating System
  - Master Operating System

  (formally Standalone, Cluster, and Multi–User Operating Systems, respectively.)
- Undelete and Scrub file utilities
- Status Code Reporter utility
- CFA Display Volume utility
- upgraded System Performance Accelerator (SPA) utility
- upgraded Sort/Merge utility
- installable Cluster utility
- modified IVOLUME utility
- new Config.sys file parameters

To install these new and upgraded system services and utilities, refer to section 2.

To run the new utilities, refer to the *BTOS II Standard Software Operations Guide.*

To run SPA, refer to the *BTOS II Standard Software Operations Guide.*

To run Sort/Merge, refer to the *BTOS II Sort/Merge Operations Reference Guide.*

To run the installable cluster utility, refer to section 9.

To run the IVOLUME Utility, refer to section 2 and appendix C.

To alter new parameters in the Config.sys file, refer to section 3.

Identifying Your BTOS System

To select the correct software, you need to identify your BTOS system. To identify the system, you should know the type of workstation you have, the type of software that can run on it, and the type of configuration you have (for example, standalone or cluster workstation).

Identifying Workstations

You can identify your workstation by two methods:

- looking at the CPU logo on the outside of the CPU, if there is one.
- looking at the system label underneath the CPU

The logo on the outside of the CPU indicates the processor your workstation has (for example, 80186, 80286); however, the logo is not on some workstations. The label underneath the CPU indicates the type of workstation you have (B26, B27).

Table 1–1 indicates the CPU logo on each workstation.

Table 1–1 **CPU Logos for BTOS Workstations**

Workstation	CPU Logo
B24	No CPU type shown
B26	No CPU type shown
B27	No CPU type shown
B27 LCW (Low Cost Workstation)	No CPU type shown
B28	CPU286
B28	CPU286i
B38	CPU386
B39	CPU386i

The CPU logo is located in a different place on each type of workstation.

On B24 workstations, the CPU type is not indicated. The ON/OFF switch is located on the back of the CPU module.

On B26 workstations, the CPU type is not indicated; however, the Unisys logo, as shown in figure 1–1, is located on the CPU module (the left–most slice as you face the unit).

On B27 workstations, the CPU type is not indicated also. The logo is located at the bottom of the CPU module. The B27 has a vertical grid covering the CPU's air vents; other workstations have a horizontal grid covering the CPU's air vents.

The B27 and B28 LCWs do not have CPU logos. The CPU is attached to the monitor, not in a separate unit as in other workstations.

On B28, B38, and B39 workstations, the logos indicate the type of CPU. (refer to table 1–1).

The Unisys label is located underneath the CPU. (For B27 LCWs, the label is underneath the CPU unit attached to the monitor.) Each label indicates the Unisys part number, the 9–digit serial number, and the style number (refer to figure 1–2).

Figure 1–1 **CPU Logos**

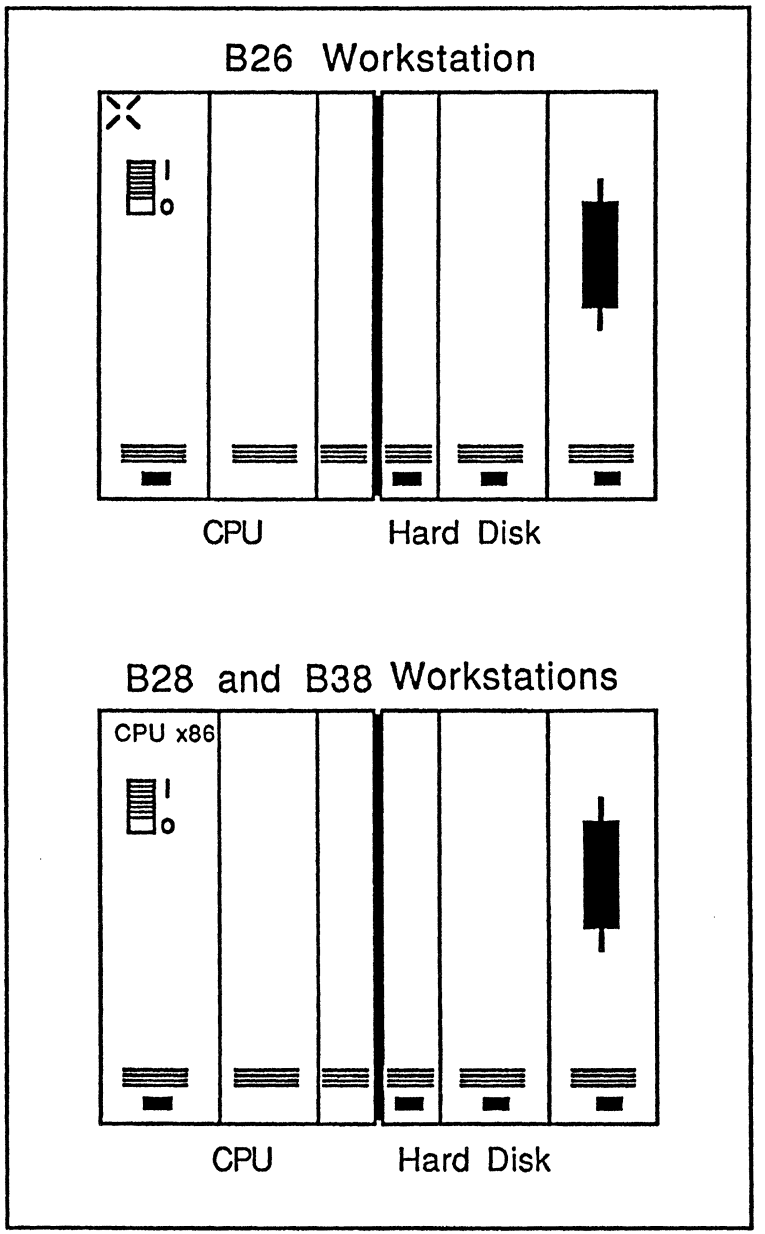
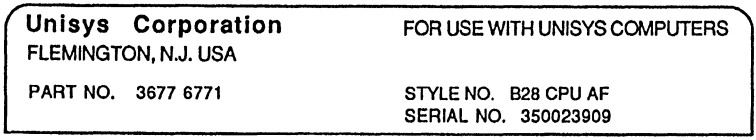


Figure 1–2 **Unisys Label**



Identifying the Operating System

If you already have BTOS installed, you can identify your existing operating system by looking at Executive screens.

On the SignOn Form and the Command Form, the BTOS name and version number appear at the top left of the screen above the double lines The operating system is in parentheses.

For example, (OS t3CLstrLfs BTOS II–3.0).

For illustrations, refer to your Standard Software operations documentation. The abbreviation "CLstrLfs" indicates a cluster operating system with local file storage. BTOS II–3.0 indicates your version of BTOS. Table 1–2 indicates the workstation for other operating system abbreviations.

If you are installing BTOS for the first time, look at the labels on each floppy diskette to identify the software, then refer to Software Packages.

Table 1–2 **Operating System Abbreviations for BTOS Workstations**

Workstation	Operating System Abbreviation
B39	t4
B38	t3
B28	t2
B27	Baws
B26	t1
B24	v1

Identifying Configurations

You can determine if your existing system is a standalone or a cluster by examining your operating system indicated in the Executive (refer to Identifying the Operating System.)

If you are a master workstation or XE master, you can use the CLUSTER STATUS command to determine your cluster configuration. This command monitors the status of the cluster and the activity of the workstations connected to the master. For more information on this command, refer to section 9.)

If you have a cluster workstation and you boot off the master, your operating system number identifies the type of system. You enter a unique operating system number during boot–up that informs BTOS of your particular workstation model and configuration. For more information about booting up, refer to Booting Up the Master.

Table 1–3 lists the workstations and their corresponding BTOS operating system numbers.

Table 1–3 **Operating System Numbers**

Workstation	Operating System Number
B24 (no local file storage)	200
B26 (hard disk)	250
B26 (floppy drives/no hard disk)	251
B26 (no local file storage)	252
B27 (hard disk)	125
B27 (floppy drives/no hard disk)	126
B27 (no local file storage)	127
B28 (hard disk)	240
B28 (floppy drives/no hard disk)	241
B28 (no local file storage)	242
B38 (hard disk)	230
B38 (floppy drives/no hard disk)	231

Table 1–3 **Operating System Numbers** (continued)

Workstation	Operating System Number
B38 (no local file storage)	232
B39 (hard disk)	220
B39 (floppy drives/no hard disk)	221

Workstation Software Installation

The following subsections provide an overview of the installation process and list memory and disk space requirements and package contents for standard workstation software.

You install all workstation software from floppy disks; therefore, a standalone workstation must have a floppy disk drive. For workstations clustered to an XE master, at least one of the cluster workstations must have a floppy disk drive. You copy the software from the floppy disks onto the system hard disk. Once copied, you can configure the software for your specific system.

Installation Tasks

To install BTOS standard software for the first time, you perform three major tasks in the following order:

1 You initialize the hard disk.
2 You load the BTOS software from floppy disks onto the hard disk.
3 You install utilities using the Software Installation Manager (SIM) program.

You do not need to initialize your disk if you are upgrading certain levels of BTOS. You need to reinitialize your disk if you are upgrading your operating system from BTOS to BTOS II. If you are upgrading your operating system from BTOS II 2.0 to BTOS II 3.0, your 2.0 System Image file may be too small. To accommodate the 3.0 System Image file, you reinitialize your hard disk during installation of BTOS II 3.0.

Section 2 provides instructions to initialize the hard disk and to install the software and utilities through the BTOS Software Installation Manager (SIM).

Configuration Tasks

If you do not accept the BTOS default configuration files, you customize your configuration by performing three major tasks in the following order:

1 You create or modify system configuration files.
2 You configure your screen.
3 You perform the necessary post–configuration tasks such as configuring the Queue Manager and configuring printer spooler files.

Section 3 describes configuration files, provides instructions to create or modify the files, and provides instructions to configure your screen. Section 8 provides instructions to configure the Queue Manager and the printer.

Memory Requirements

Table 1–4 lists approximate the memory and disk space requirements for BTOS configurations.

Table 1–4 **BTOS Memory and Disk Space Requirements**

Configuration	Executive Memory (KB)	OS Memory (KB)	Disk Space (Sectors)
B24	140	156	320
B26 Standalone	140	166	371
B26 Master	140	242	400
B26 Cluster	—	141	343
B26 Cluster with local file storage	—	194	408
B27 Standalone	140	194	400
B27 Master	140	271	427
B27 Cluster	—	158	323
B27 Cluster with local file storage	—	208	427
B28 Standalone	140	392	585
B28 Master	140	434	587
B28 Cluster	—	267	436
B28 Cluster with local file storage	—	364	598

Table 1–4 **BTOS Memory and Disk Space Requirements** (continued)

Configuration	Executive Memory (KB)	OS Memory (KB)	Disk Space (Sectors)
B38 Standalone	140	392	585
B38 Master	140	466	587
B38 Cluster	—	296	436
B38 Cluster with local file storage	—	394	598
B39 Standalone	140	392	585
B39 Master	140	486	586
B39 Cluster with local file storage	140	412	598

To install BTOS, the minimum capacity for your system hard disk is 20MB. Table 1–5 lists recommended minimum capacities for workstation hard disks.

Table 1–5 **Minimum Capacity for Workstation Hard Disks**

Workstation	Minimum Capacity
B24 TWS	1MB (not an option)
B26	1MB (master) 512KB (cluster)
B27	1MB (master) 512KB (cluster)
B28	2MB (master) 1MB (cluster)
B38	2MB (master) 1MB (cluster)
B39	4MB (master and cluster)

Software Packages

All BTOS standard workstation software is distributed on 5–1/4–inch floppy disks. There are several packages included in standard software; each package contains from one to eight floppy disks. Each disk within a package is labelled with a

Unisys style identification number unique to that package. Table 1–6 provides the number of disks and the identification numbers for each BTOS standard software package.

Table 1–6 **BTOS Standard Software Packages**

Software Package	Number of Disks	Identification Number
Basic Operating System	3	*BxxSTX
System Utilities	8	B25SUX
Real Mode/Protected Mode Cluster Operating System	6	B25CLX
Master Operating System	1	*BxxMOS
Customizer	6	B25CSX
Language Development	2	B25LDX
Computer Based Training	9	B25CBT
Generic Nationalization Tools	2	LB25NS2
Local Language Package	15**	LB25OS2

*xx is your workstation type; for example, B26STX or B39STX

**The number of diskettes varies, depending upon the language.

You install the Basic Operating System Package on:

- all workstations that you are installing BTOS on for the first time
- a standalone workstation
- XE master
- workstation master

The Basic Operating System Package contains the basic system software for Real and Protected mode workstations and the XE master. The package contains three disks, the first one of which is a bootable installation disk that includes the SIM software.

If you are installing the Basic Operating System Package on an XE master, you must also install the Real Mode/Protected Mode Cluster Operating System Package on the XE master.

You install the System Utilities Package on the same workstations that you install the Basic Operating System Package on. The System Utilities Package contains a set of

mandatory and optional utilities that enable you to use a workstation in a local file storage environment. SIM lets you select the optional utilities. The package contains eight disks.

You install the Real Mode/Protected Mode Cluster Operating System Package on a master workstation. This package contains a complete set of the standard cluster operating system and utilities for Real and Protected mode clusters. The package contains six disks.

You install the Master Operating System Package on a master workstation. Prior to this, you install the Basic Operating System Package, the System Utilities Package, and the Real Mode/Protected Mode Cluster Operating System Package on the workstation. The Master Operating System Package is a one-disk package containing a single Protected Mode or Real Mode master operating system. The Real Mode/Protected Mode Cluster Operating System Package controls the installation of the Master Operating System Package.

You install the Customizer Software Package on any workstation. Customizer is a development tool that lets you generate customized Protected and Real Mode Basic Operating Systems, Master Operating Systems, or Real Mode/Protected Mode Cluster Operating Systems for BTOS workstations. The package contains six disks.

You install the Language Development Package on any workstation. This package contains the Assembler, Linker, Librarian, and Native Language Support (NLS) files; Sequential Access Method (SAM) generation files; and the software support libraries. The package contains two disks.

You install the Computer Based Training on B26, B27, B28, B28, or B38 workstations. The package contains an on-line tutorial that provides you with interactive software training. The package contains nine disks.

You install the Generic Nationalization Tools on B28 and B38 workstations that run BTOS II 2.0 or higher. The package contains software that translates displays and messages and updates keyboard mapping tables in order to adapt BTOS to a language other than English. The package contains two disks.

You install the Native Language Support Package on B26 or higher workstations. The package contains programs and files that expedite the nationalization of BTOS and applications. The package contains approximately 15 disks.

SIM Program

SIM is a menu–driven installation program that lets you select the software you want to install. SIM compares the amount of disk space available to the amount required and alerts you if the amount is not sufficient. During installation, it lets you select utilities from a list, prompts you to insert disks (by the identification numbers), and describes the progress of installation operations.

SIM is provided in the Standalone Software Package (BXXST2–3). The system copies SIM onto your system's hard disk at the beginning of the installation process. SIM is then executed automatically and takes control of installation of the remaining Standard Software packages, except the Customizer Software Package.

Section 2 provides detailed installation procedures using SIM.

XE Master Software Installation

The following subsections provide an overview of the installation process and describe memory and hard disk requirements and software media for BTOS installed on the XE master.

You copy XEBTOS software from magnetic tape onto the system hard disk. Once copied, you configure the software for your specific system. Refer to your XE500 administration documentation for detailed information on the XE master.

Installation Tasks

To install the XE master software, you perform two major tasks in the following order:

1 You load XEBTOS software from magnetic tape onto the XE master system disk.
2 You load the workstation BTOS software from floppy disks onto the XE master system disk using workstation software installation procedures.

Section 5 describes XEBTOS installation procedures for the XE master. It includes instructions to operate the tape drives.

Configuration Tasks

To configure the software, you perform two major tasks in the following order:

1 You create or alter system configuration files using the mBTOS CONFIG utility.

2 You perform the necessary post-configuration tasks such as backing up your system files, creating BTOS master command sets, configuring the AdminAgent, configuring the Queue Manager, configuring printer spooler files, and creating input/output (I/O) device configuration files.

Section 6 describes configuration files and provides instructions to create or modify the files. Section 7 describes optimizing XE master performance with the AdminAgent. Section 8 provides instructions to configure the Queue Manager and the printer.

Software Release Media

The XE master operating system software is available on the following types of release media:

- half-inch tapes
- quarter-inch cartridge (QIC) tapes

The type of media you use depends upon the type of master processor in your XE master. If it is a File Processor (FP) master processor, you use the XE master operating system software that is distributed on QIC tape. If your XE master has a Disk Processor master processor, you use the XE master operating system software that is distributed on QIC or half-inch tape. Appendix A describes the processor-numbering scheme and provides illustrations to aid in locating the processors.

In addition, you should also have a BTOS workstation standard software release package on floppy diskettes. You use the diskettes to load the workstation system and environmental software.

Installing Workstation Software

This section provides software installation procedures through the Software Installation Manager (SIM) program. SIM installs BTOS II 3.0 on B26 or higher workstations. This section covers:

- SIM's screen layout and and key usage
- using the SOFTWARE INSTALLATION command
- installing the Basic Operating System Package
- installing the System Utility Package
- installing the Real Mode/Protected Mode Cluster Operating System Package
- installing the Master Operating System Package
- installing the Customizer Software Package
- deinstalling software

If problems arise during the installation process, refer to appendix A for troubleshooting guidelines.

If you are installing the Basic Operating System on an XE master, refer to section 5.

Installation Summary

SIM is on the disk labelled BxxSTX–3 in the Basic Operating System Package (xx is the workstation type, for example, B26STX–3). Before you can use SIM, you initialize or update the hard disk, install commands, and install SIM onto your hard disk. Once SIM is installed, it takes over the installation process, and based on your selections in menus, it installs utilities and other optional software.

The installation process:

- loads the system using the bootable disk in the Basic Operating System Package
- initializes the hard disk, installs commands, and sets the path and directory
- installs SIM onto the hard disk
- selects system utilities packages and other software packages and installs the Basic Operating System through SIM

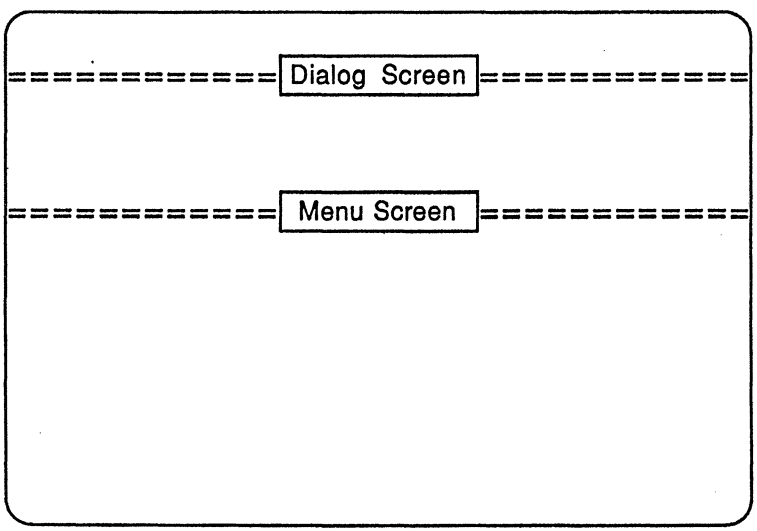
- installs system utilities using the disks in the System Utility Package
- installs cluster software and utilities (if applicable) using the Real Mode/Protected Mode Cluster Operating System Package
- installs master operating system (if applicable) using the Master Operating System Package
- install optional software (Language Development Package or Customizer Package)

For start–up procedures, refer to Powering Up Your Workstation. To begin the installation process, refer to Installing the Basic Operating System Package.

SIM Screen Layout and Key Usage

SIM's screen is divided into two parts: an upper and lower frame. The upper frame is the Dialog Screen and the lower frame is the Menu Screen. Each screen is labelled. Refer to figure 2–1.

Figure 2–1 **SIM Dialog Screen and Menu Screen**



Dialog Screen

The Dialog Screen presents prompts, help messages, and installation status. Prompts include instructions to insert or remove disks, instructions to select or deselect items within a menu, and questions presented to you. You must respond to the questions with a yes or no answer in the Menu Screen, which changes to reflect your answer.

When SIM has installed all of the options you select on a disk, it instructs you to remove the currently loaded disk and insert the next required disk in the Dialog Screen.

The status of installation appears in the Dialog Screen. For example, as each utility is installed, the Dialog Screen reports that the run command has been created for it.

Menu Screen

The Menu Screen displays lists of utilities and files. You select the items you want installed from menus of optional software. Once SIM begins installing the selected software, a list of files that are being copied onto your hard disk appear in the Menu Screen.

If SIM must copy many files and there is not enough room to display their names in the Menu screen, the file names wrap around to the topmost line of the Menu Screen.

Selecting SIM Options

You use the arrow keys and the MARK key to select options displayed in the Menu Screen.

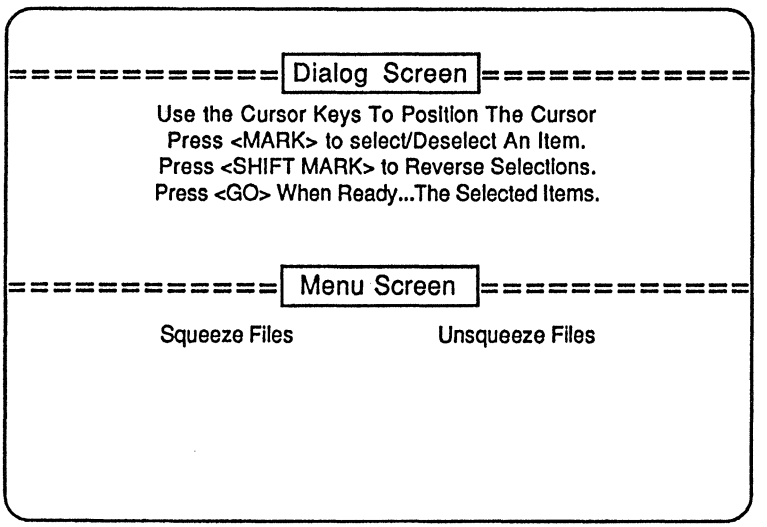
When the Menu Screen presents you with a list of items, you use the arrow keys to position the cursor on your selection, which becomes higlighted. If the cursor is on an item, that item appears dimly highlighted. You press MARK to select the item. Your selection appears fully highlighted.

SIM preselects some items for you; these defaulted selections are highlighted when the menu appears You press MARK to deselect the item and SHIFT–MARK to reverse the selection. If no items are preselected, you press SHIFT–MARK to select them all.

When the Dialog Screen presents you with a question that calls for a yes or no answer, the words, **YES** and **NO**, are displayed in the Menu Screen. You press the right or left arrow to select yes or no, or **Y** for yes and **N** for no.. Your selection is in reverse video.

If you position the cursor on an item, then press the HELP key, SIM presents instructions in the Dialog Screen. The instructions tell you which keys to press to select items (refer to figure 2–2).

Figure 2–2 **Dialog Screen Directions for Key Usage**



After you press **GO** to begin processing, the Dialog Screen displays the processing status. You do not need to press **GO** after you insert disks when SIM is installing software.

After you press **GO** to begin processing, the Dialog Screen displays the processing status. You do not need to press **GO** after you insert disks when SIM is installing software.

The functions of keys used in SIM are summarized in table 2–1.

Table 2–1 **SIM Keyboard Functions**

Key	Function
MARK	□ selects an unselected item □ deselects a selected (highlighted) item
SHIFT–MARK	□ reverses the selection if highlighted defaulted items appear □ selects all items if no highlighted defaulted items appear
CANCEL	cancels all selections
GO	processes selections
FINISH	aborts SIM
Y	selects YES
N	selects NO
Left Arrow	□ moves the cursor to the left one column at a time in columns of items □ selects NO in yes or no options
Right Arrow	□ moves the cursor to the right one column at a time in columns of items □ selects YES in yes or no options
Up Arrow	moves the cursor up one item at a time within a list
Down Arrow	moves the cursor down one item at a time within a list

Getting Help with SIM

If an item within a list is unclear to you, you use help features to get an explanation. In some cases, SIM informs you of software that accompanies the item. For example, if you get help with the Telephone Server utility in the Utility Menu, SIM informs you that you need to install the XBIF utility with it.

To get help on any item in a SIM menu, use the following procedure:

1 Use the arrow keys to move the cursor to the item you need help with.

SIM highlights the item when you place the cursor on it.

2 Choose one of the following:

- Press HELP.
- Press MARK, then HELP.

If your press HELP, SIM displays a brief description of the item in the Dialog Screen.

If you press MARK, then HELP, SIM displays instructions in the Dialog Screen on how to select items (refer to figure 2–2).

3 Press any key to restore the Dialog Screen.

SOFTWARE INSTALLATION Command Versus the RUN Command

When you install BTOS II on your hard disk, you are copying program files to a destination directory in the beginning of the installation process. Once the system creates the [SYS] volume, the SIM program takes over the installation process.

The system can execute SIM from a Run command or you can execute SIM with the SOFTWARE INSTALLATION command. The procedures in this section are written using the RUN command; that is, you select your packages and optional software in SIM and you do not need to type SOFTWARE INSTALLATION each time you install the first diskette within a new package. For more information on the SOFTWARE INSTALLATION command, refer to your Standard Software operations documentation.

Powering Up Your Workstation

You power up your system by setting the **POWER** switch to ON; 1 indicates ON and 0 indicates OFF.

If you have a cluster workstation without local file storage, you must power up the master first.

Once the workstation is powered, the system attempts to bootstrap BTOS. Bootstrapping the system loads BTOS from disk storage to active memory.

The system first attempts to boot from a diskette in the floppy drive. If the floppy drive is empty or contains an unbootable diskette, the system then attempts to boot from the local hard disk. If the hard disk does not contain bootable software, the system then attempts to boot from the master.

If you are installing BTOS on your workstation, you do not need to boot your system at this time. You are ready to insert the bootable floppy disk from the Basic Operating System Package (refer to Installing the Basic Operating System Package).

Booting From the Master

How you boot up your workstation determines the version of workstation BTOS that is loaded into the workstation. The version of workstation BTOS software that is loaded into your workstation determines whether the workstation operates in standalone or cluster mode and with or without local file storage.

BTOS workstations connected to the XE master or a workstation acting as the master, run as cluster workstations.

To configure your workstation to run in cluster mode, you must follow a separate bootup procedure for each of the following workstation configurations:

- a BTOS workstation that has Basic Operating System software in its local file system
- a BTOS workstation that does not have the Basic Operating System in its local file system

Booting a Workstation Having Basic Operating System Software

Your workstation may have the Basic Operating System software stored on a local hard disk or floppy disk. When the workstation is powered up or rebooted, it loads that operating system into its Central Processing Unit's (CPU's) on–board memory.

However, to access the master's storage devices and its local hard disk, you must configure your BTOS workstation as a cluster workstation. This loads the workstation

cluster–mode version of BTOS from the master to your workstation or from your local file storage.

One advantage to using your workstation in a Basic Operating System environment is that your operating system still runs if the master is shut down. However, when the master is brought up again, you must reboot your workstation (using the following procedures) to return it to the cluster mode.

Caution: If a workstation connected to the XE master is attempting to operate as a master or a standalone (that is, if a workstation with Master or Basic Operating System software is booted up locally while the XE master is operating), the system will crash.

Note: If you are installing BTOS, you must boot your system from the bootable floppy disk in the Basic Operating System Package (BxxST2-1).

To boot from a master when your system has local Basic Operating System software, use the following procedure:

1 Be sure that the master has been successfully powered on (for XE masters, a 20 appears in the STATUS display on the XE hardware).

2 While holding down the **Spacebar** on your BTOS workstation, power up or reboot your workstation.

- If you have a B27 workstation, restart the system by moving the **POWER** switch to the OFF position, wait at least 10 seconds; then move it back to the ON position.
- If you have a B26, B28, B38 workstation, reset the system by pressing the **RESET** button located on the back panel of your workstation.
- If you have a B39 workstation, reset the system by pressing the **RESET** button located on the left side panel of your workstation's CPU.

The system displays the Read Only Memory (ROM) number then a set of characters (such as B, C, D, L, P, T:). The cursor appears after the colon.

3 Release the **Spacebar**.

The set of characters remain on the screen.

4 Enter the letter **T**.

The characters **OS:** appear on the screen.

5 Enter the appropriate workstation identifier (refer to table 1–3).

Some B27 workstations display the value you are to enter.

6 Press **RETURN**.

The system displays the Read Only Memory (ROM) number and a set of characters (such as B, C, D, L, P, T:). The cursor appears after the colon.

7 Enter the letter **B**.

After a pause, the system .jcl files run and the SignOn menu appears.

8 Sign on to the master by entering a valid user name for the master in the **User Name** field; and if the the master is password–protected, enter the password in the **Password** field (refer to section 3.)

Booting a Workstation Having No Basic Operating System Software

To boot from the master when your system does not have local Basic Operating System software, you use the following procedure:

1 Be sure that the master has been successfully powered on (for XE masters, a 20 appears in the STATUS display on the XE hardware).

2 Power up your BTOS workstation.

The workstation automatically boots from the master when it is powered up or rebooted.

The system responds by displaying **L.....** This response indicates that the workstation is going through the boot–up process.

When the boot–up process is complete, the signon form appears on the screen. You can now use your workstation as part of the master's system.

3 Sign on to the system by entering a valid user name in the **User Name** field; and if the the system is password–protected, enter the password in the **Password** field (refer to section 3.)

Installing the Basic Operating System

If you have a standalone workstation, you use the Basic Operating System Package (three disks) and System Utilities Package (eight disks) to install BTOS.

To install the Basic Operating System, you first initialize or update your hard disk. Initializing the disk erases all data and software on the disk, including your files. You then copy the BTOS files to your hard disk.

Note: If you are updating your hard disk or reinitializing your hard disk from prior levels of BTOS II, you should save your existing Sys.Cmds file to Sys.Cmds–save, and install the new Sys.Cmds file at your first opportunity during installation. When you finish installing the software, use the COMMAND FILE EDITOR command (refer to Standard Software operations documentation) to copy any custom commands you have created into the new Sys.Cmds file.

To install the Basic Operating System Package, use the following procedure:

1 Insert the first Basic Operating System Package disk (BxxSTX–1) in the workstation floppy disk drive (drive [f0]).

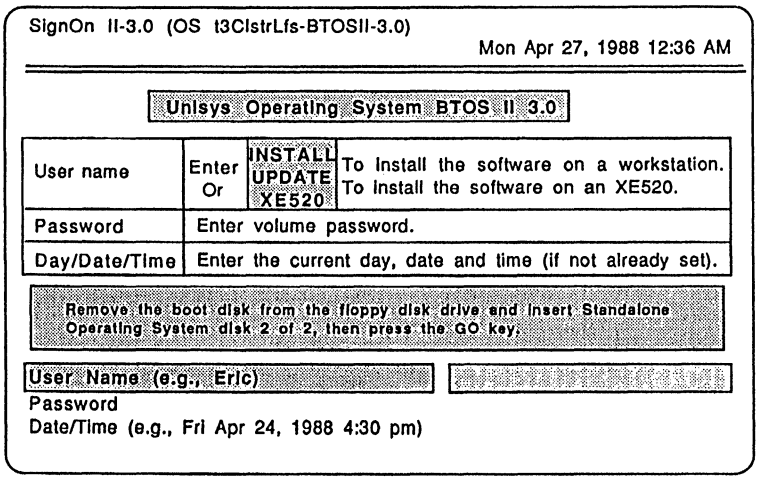
2 Restart or reset the system to boot from the disk.

(Refer to step 1 in Booting From the Master.)

The Software Installation SignOn menu appears (refer to figure 2–3). The **User name** field is highlighted.

3 Remove the BxxSTX–1 disk, and replace it with the BxxSTX–2 disk.

Figure 2–3 **Software Installation SignOn Menu**


SignOn II-3.0 (OS t3ClstrLfs-BTOSII-3.0)
Mon Apr 27, 1988 12:36 AM
Unisys Operating System BTOS II 3.0
User name
Enter
Or
INSTALL
UPDATE
XE520
To Install the software on a workstation.
To Install the software on an XE520.
Password
Enter volume password.
Day/Date/Time
Enter the current day, date and time (if not already set).
Remove the boot disk from the floppy disk drive and insert Standalone Operating System disk 2 of 2, then press the GO key.
User Name (e.g., Eric)
Password
Date/Time (e.g., Fri Apr 24, 1988 4:30 pm)

4 Choose one of the following:

- To initialize your hard disk enter **Install** in the **User name** field.
- To install the new software without initializing your system disk, enter **Update** in the **User name** field.

Note: If you are upgrading from BTOS 8.x to BTOS II, you must use the **Install** option, not **update**.

Caution: Initializing your volume erases the existing data and files on your hard disk. To save data or files, discontinue installation and back up your disk to another storage device.

---

5 Press **RETURN**.

The cursor moves to the **[Password]** field.

6 If your system is currently password–protected, enter the password in the **[Password]** field.

7 Press **RETURN**.

The cursor moves to the **Date/Time** field.

8 Choose one of the following:

- If the correct day, date and time are currently displayed in the upper right-hand corner of the screen, proceed to step 10.
- If the correct day, date, and time are not currently displayed, enter them as shown in one of the following formats:
- 9/6/85 Fri 8:00 PM
- 6–Sep–85 20:00
- 8:00 Friday 6 September 1985 PM

Note: When entering the time based on a 24–hour clock, the system assumes that time entries between 7:00 and 11:59 are AM, and between 12:00 and 6:59 are PM. To specify a time before 7:00 AM or after 7:00 PM, you must include AM or PM.

9 Press **GO**.

10 Choose one of the following:

- If you are initializing your hard disk, the IVolume Parameters menu appears. Proceed to step 12.
- If you are updating your existing operating system, the Path and Password menu appears. Proceed to step 19.

11 Press **GO**.

The IVolume Parameter System Defaults appear on the screen. Refer to appendix C for an explanation of each parameter and an example of the IVOLUME Paramater form.

12 Choose one of the following:

- To bypass volume initialization, press **CANCEL–GO**, and proceed to Installing the System Utilities Package.
- To accept the default IVolume Parameters, proceed to step 14.

- If you choose not to accept the default IVolume Parameters, overtype the existing parameters.

  Notes:

  1 If you are installing BTOS on a B28, B38, or B39 workstation and will be using Context/Window Manager, enter **3000** in the **Crash file** parameter field.

  2 The volume name for each hard disk in the cluster configuration must be unique. Accept the **Volume name** parameter default **Win** for only one workstation in your cluster configuration.

13 Press **GO**.

14 If you have not previously installed BTOS, the system prompts you for a vendor code, and for the bad spots (sectors) on your hard disk.

Note: Your vendor code and a record of the bad spots are located on the underside of your workstation. Refer to your Standard Software documentation.

15 Press **GO**.

16 Choose one of the following:

- If your workstation is password–protected, the system prompts you to type the volume password and press **GO**.
- If your workstation is not password–protected, proceed to step 17.

17 Choose one of the following:

- If you have previously initialized your volume, the system prompts you to confirm the reinitialization process by pressing **GO**.
- If you have not previously initialized your volume, volume initialization begins.

Volume Initialization may take a considerable amount of time, depending upon the size of your hard disk. After the volume is initialized, the system does a surface pass to ensure the volume contains no bad spots. You specify from 0 to 8 passes in the IVOUME command form. The system performs one pass on valid volumes and eight passes on nonvalid volumes. (A valid volume is a formatted and uncorrupted disk.) If you entered 0 in the [**surface tests**]

field, the system does not perform a pass on the volume. If the system finds bad spots, it records them and continues.

Next, the system displays the Path and Password menu.

18 If you want to specify a volume name (other than d0) and password, indicate both at the Path and Password menu.

19 Press **GO**.

- If you are initializing your hard disk, the system copies Basic Operating System files to the volume. Proceed to step 21.
- If you are updating the existing operating system, the system displays a prompt asking you if you want to overwrite your commands.

20 Choose one of the following:

- Press **GO** to overwrite the existing Sys.Cmds file.
- Press **CANCEL–GO** to bypass overwriting the existing Sys.Cmds file.

The system copies the Basic Operating System files to the volume, causes the hard disk to be the new system volume, and creates a directory with room for 75 files.

21 When the system prompts you, remove the second Basic Operating System Package disk (BxxSTX–2) and insert the third disk (BxxSTX–3).

22 Press **GO**.

The system copies SIM files to the new directory on the hard disk and displays instructions to customize SIM's installation of utilities. Refer to figure 2–4.

23 Read the instructions displayed on the screen and shown in figure 2–4.

24 Press **GO**.

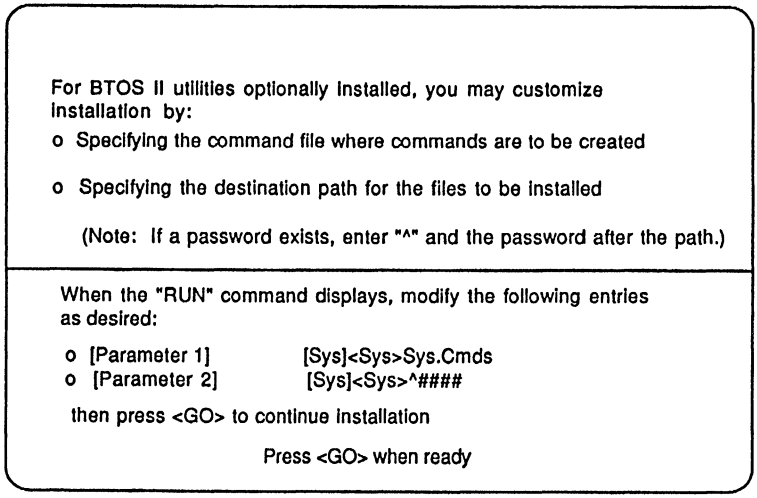
The system displays the Run Command form.

25 Choose one of the following:

- modify the run command form according to the instructions in figure 2–4.
- accept the run command form. Proceed to step 26.

26 Press **GO**.

Figure 2–4 **Customizing Utilities Installation Display**


For BTOS II utilities optionally installed, you may customize installation by:
o Specifying the command file where commands are to be created
o Specifying the destination path for the files to be installed
(Note: If a password exists, enter "^" and the password after the path.)
When the "RUN" command displays, modify the following entries as desired:
o [Parameter 1] [Sys]<Sys>Sys.Cmds
o [Parameter 2] [Sys]<Sys>^####
then press <GO> to continue installation
Press <GO> when ready

Preselecting Software Packages for SIM Installation

SIM continues with the installation process, letting you preselect one of these packages before it continues installing the Basic Operating System:

- System Utilities
- Language Development
- Cluster Operating System

Note: If you are installing BTOS for the first time, you must install the System Utilities, even if you are installing a cluster operating system. If you previously installed BTOS, and you want SIM to control the installation of the Language Development or the Real Mode/Protected Mode Cluster Operating System, you select the package at this time.

You select a package for SIM to install once it has finished installing the Basic Operating System. If you preselect a package at this time, SIM will prompt you to insert the first diskette of that package at the end of Basic Operating System installation.

When you insert the first diskette of the package you selected, you do not need to press **GO,** and you do not need to use the **SOFTWARE INSTALLATION** command.

In the Dialog Screen, Sim informs you that it has installed the Basic Operating System as the default and asks you if you want to replace it with the ClusterLfs (Cluster with Local File Storage) operating system. In the Menu Screen SIM displays the words, **YES** and **NO.** To select the operating system, refer to the procedures to preselect packages.

To preselect SIM installation of the System Utilities, Language Development, or the Real Mode/Protected Mode Cluster Operating System, use the following procedure:

1 Choose one of the following:

- press the left arrow key or **N** for a NO answer if you want to install the Basic Operating System.
- press the right arrow key or **Y** for a YES answer if you want to replace the Basic Operating System with the ClusterLfs operating system.

2 Press **GO.**

SIM displays the **System Utilities, Language Development** and **Cluster Operating System** packages in the Menu Screen.

System Utilities is the default and appears highlighted. The package the cursor is on appears dimly highlighted.

3 Choose one of the following:

- Use the arrow keys to move the cursor to the software package you want SIM to install, then press **MARK.**
- Press **MARK** to deselect software packages.
- Press **SHIFT–MARK** to reverse the selection.

4 Press **GO.**

SIM copies mandatory Basic Operating System files onto the hard disk. A list of the files being copied is displayed in the Menu Screen; the Menu Screen label indicates the action (refer to figure 2–5).

5 When SIM prompts you, remove the third Basic Operating System Package disk (BxxSTX–3) and reinsert the second disk (BxxSTX–2).

SIM copies more Basic Operating System software onto the hard disk. A list of the files SIM copies is displayed in the Menu Screen; the Menu Screen label indicates the action.

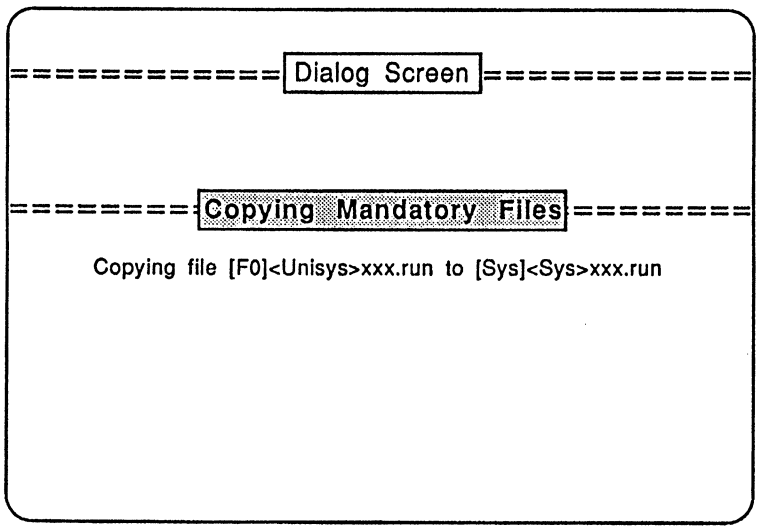
6 When SIM prompts you, remove the second Basic Operating System Package disk (BxxSTX–2) and reinsert the first disk (BxxSTX–1).

   SIM copies more Basic Operating System software onto the hard disk and updates a command file on the hard disk. A list of the files SIM copies is displayed in the Menu Screen; the Menu Screen label indicates the action.

7 When SIM prompts you, remove the first Basic Operating System Package disk (BxxSTX–1) and insert the diskette displayed in the Dialog Screen.

   Installation of the Basic Operating System is complete.

Figure 2–5 **Copied Files Shown in Menu Screen**



Installing System Utilities

When installation of the Basic Operating System Package is complete, SIM prompts you to install the Utilities Package.

The System Utilities Package consists of eight disks containing both mandatory and optional utilities. Mandatory utilities are on the first disk; optional utilities are on the remaining disks. Table 2–2 lists the optional utilities on each disk.

Table 2–2 **Optional Utilities on Disks**

Disk Number	Utilities
B25SUX–2:	Backup Volume Bad Sector Bad Spot Reporter Set Directory Protection Set Time
B25SUX–3:	Change Volume Name Command File Editor Create Configuration File Create Message File Debug File Dump DCX Server
B25SUX–4:	Editor Extended Crash Dump File Protection Undelete
B25SUX–5:	Floppy Copy Format Head Park Maintain File Mouse Hardware ID
B25SUX–6:	Performance Statistics Partition Status PLOG Printer Configuration Sort/Merge
B25SUX–7:	Queue Manager Spooler SPA Telephone XBIF XESpooler
B25SUX–8	PercVersion

If you selected installation of the utilities package in the first SIM menu (refer to Preselecting Software Packages for SIM Installation), SIM remains in control of the installation process and prompts you to insert the utilities disk.

If you did not select the utilities package in the first SIM menu, you insert the first utilities disk and install the software with the SOFTWARE INSTALLATION command.

If you need detailed information about the utilities, refer to the *BTOS II Standard System Operations Guide.*

If you need detailed information about Sort/Merge, refer to the *BTOS II Sort/Merge Programming Reference Guide.*

To install the System Utilities Package, use the following procedure:

1 Insert the first disk (B25SUX–1) of the System Utilities Package in the workstation floppy disk drive (drive [f0]).

The Optional Utility menu appears on the Menu Screen (refer to figure 2–6).

2 Choose one of the following:

- Use the arrow keys to move the cursor to the utility you want installed, then press **MARK**.
- Press **Mark** to deselect utilities.
- Press **SHIFT–MARK** to reverse selections (if utilities are not selected, to select all utilities)

Note: If you need more information about the utilities listed in the menu, use the arrow keys to move the cursor to a utility, (the utility is dimly highlighted when the cursor is on it), then read the description of the utility in the Dialog Screen.

Note: If you are installing System Utilities on the XE master, the **Queue Manager & Spooler** option is shown as **Spooler**.

3 Press **GO**.

If you selected the Mouse utilities, refer to Selecting Options Within SIM Submenus.

For all other selections, SIM installs utilities based upon the choices you made. The Menu Screen displays utility file names as SIM copies them to hard disk; the Dialog Screen displays the installation status.

SIM automatically creates a command to run each utility you selected. As each utility is copied onto the hard disk, the Dialog Screen displays a message telling you the run command has been created for it (refer to figure 2–7).

Figure 2–6 **Optional Utility Menu**

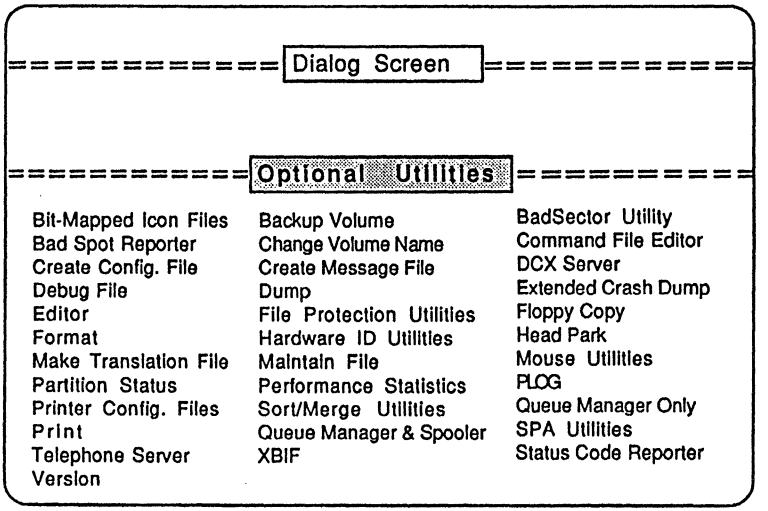
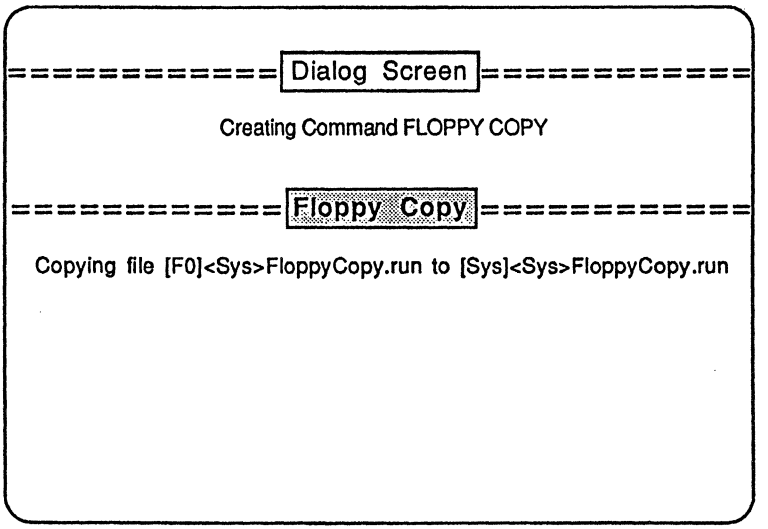


Figure 2–7 **Created Commands Shown in Dialog Screen**



4 When SIM prompts you, remove the first System Utility Package disk (B25SUX–1) and insert the utility disk indicated on the screen.

Note: Disk changes are not included here because your choice of utilities determines which utility disk is required. Table 2–2 indicates the utilities in each disk.

5 Continue removing the utility disks and reinserting (if necessary) the disks indicated on the screen as SIM prompts you until utility installation is complete.

Selecting Options Within SIM Submenus

SIM presents submenus if you install

- Mouse Utilities
- Sort/Merge Utilities
- Language Development Package

The label on the screen indicates the software.

For more information on Mouse or Sort/Merge, refer to your Standard Software operations documentation.

The Language Development Package contains the Assembler, Linker, Librarian, Native Language Support (NLS), and Sequential Access Method (SAM) generation software and the software support libraries. The package consists of two disks.

To select options within SIM submenus, use the following procedure:

1 Choose one of the following:
   - Use the arrow keys to move the cursor to the files you want installed, then press **MARK**.
   - Press **MARK** to deselect software.
   - Press **SHIFT–MARK** to reverse the selection.

   Note: If you need more information about the files listed in the submenus, press **HELP** after you press **MARK**.

2 Press **GO**.

   SIM installs the files and continues with installation until all selected software is copied onto your hard disk.

If your volume is to have master operating system capabilities, refer to Installing Real Mode/Protected Mode Cluster and Master Operating Systems.

Installing Real Mode/Protected Mode Cluster and Master Operating Systems

The Real Mode/Protected Mode Cluster Operating System Package is a complete software set that contains the cluster operating system and the cluster utilities. The Master Operating System Package accompanies the Real Mode/Protected Mode Cluster Operating System Package. Like the Basic Operating System Package and the System Utilities, SIM controls the installation of the cluster and master operating systems.

To install the master operating system, you first install the Basic Operating System and System Utilities Packages (refer to Installing the Basic Operating System and Installing the System Utilities), then you install the Real Mode/Protected Mode Cluster Operating System and Master Operating System Packages.

The Real Mode/Protected Mode Cluster Operating System Package contains 6 disks; the Master Operating System Package contains 1 disk. Table 2–3 lists the disk used by each workstation in the Real Mode/Protected Mode Cluster Operating System Package.

Table 2–3 **Workstation Files on Real Mode/Protected Mode Cluster Operating System Disks**

Disk Number	Workstation
B25CLX–1	B24
B25CLX–2	B26 no local files B26 local floppy only B26 local hard disk
B25CLX–3	B27 no local files B27 local floppy only B27 local hard disk
B25CLX–4	B28 no local files B28 local floppy only B28 locan hard disk
B25CLX–5	B38 no local files B38 local floppy only B38 local hard disk
B25CLX–6	B39 local hard disk

You install the Real Mode/Protected Mode Cluster Operating System Package on the master volume. The package contains six disks and includes the cluster software for every type of workstation you can include in a cluster configuration. After it is installed, any cluster workstation can boot from the master and use the operating system applicable to that workstation.

After SIM has installed the entire Real Mode/Protected Mode Cluster Operating System Package, it prompts you to insert the appropriate Master Operating System disk. The Master Operating System disk contains the operating system file for master operation. BTOS overwrites the current System Image file with a master System Image file.

If you selected the Real Mode/Protected Mode Cluster Operating System option from the first SIM screen, you insert the first cluster disk; you do not need to press **GO**. If you did not select the this option, you use the SOFTWARE INSTALLATION command.

To install the Real Mode/Protected Mode Cluster Operating System Package and the Master Operating System Package, use the following procedure:

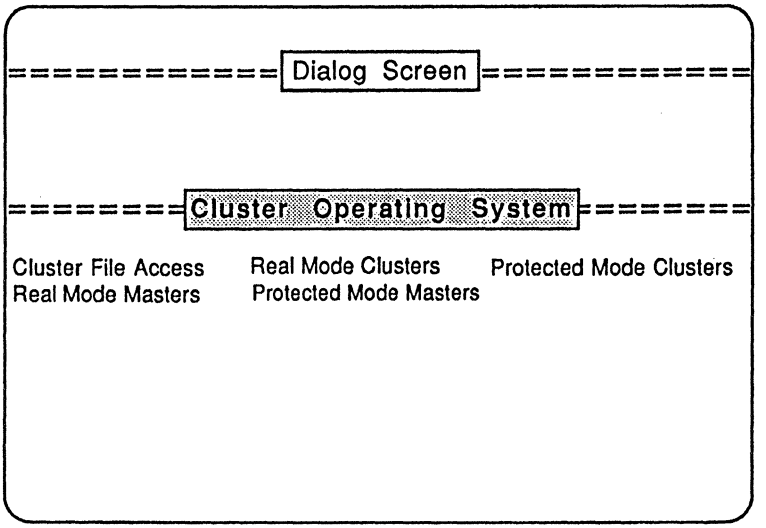
1 Insert the first disk of the Real Mode/Protected Mode Cluster Operating System Package (B25CLX–1) in the master workstation floppy disk drive [f0].

   SIM displays the first cluster menu (refer to figure 2–8).

2 Choose one of the following:

- To install Cluster File Access on your workstation, use the arrow keys to move the cursor to that item, then press **MARK**.
- To install the Real Mode cluster operating system, use the arrow keys to move the cursor to that item, then press **MARK**.
- To install the Protected Mode cluster operating system, use the arrow keys to move the cursor to that item, then press **MARK**.
- To install the Real Mode master operating system, use the arrow keys to move the cursor to that item, then press **MARK**.
- To install the Protected Mode master operating system, use the arrow keys to move the cursor to that item, then press **MARK**.

Figure 2–8 **Cluster Menu**



3 Press **GO**.

SIM creates cluster commands, installs cluster run files, and copies more files onto the hard disk.

4 When SIM prompts you, remove the Real Mode/Protected Mode Cluster Operating System Package disk (B25CLX–1).

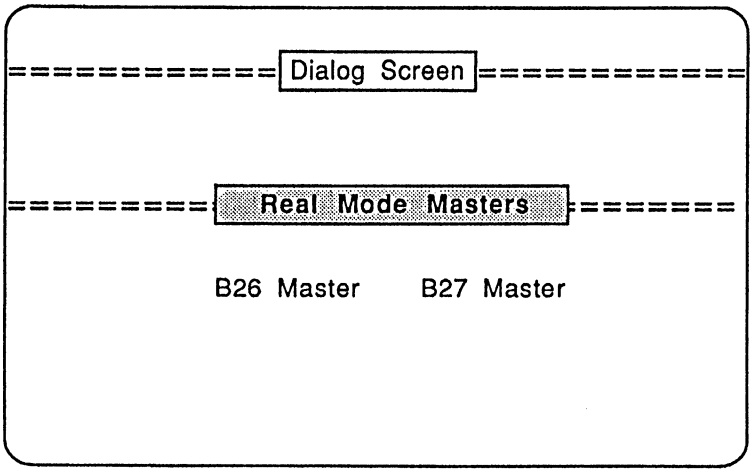
If you selected a master operating system, refer to Real and Protected Mode Master Systems.

If you selected a cluster operating system, refer to Real Mode and Protected Mode Cluster Systems.

Real and Protected Mode Master Systems

If you selected the Real Mode master operating system, the submenu shown in figure 2–9 appears in the Menu Screen. If you selected the Protected Mode master operating system, the submenu shown in figure 2–10 appears in the Menu Screen. The label on the screen indicates your selection. If you need more information about the type of workstation you have, refer to Identifying Your Workstation in section 1.

Figure 2–9 **Real Mode Master System Submenu**



To select a Real or Protected Mode workstation as the master system, use the following procedure:

1 Use the arrow keys to move the cursor to your workstation type, then press **MARK**.

2 Press **GO**.

3 When prompted, remove the Real Mode/Protected Mode Cluster Operating System Package disk and insert the Master Operating System disk (BxxMOS) for your workstation.

SIM copies master operating system files onto your volume, overwriting the cluster and allowing your volume to function as a master. A list of the files SIM copies is shown in the Menu Screen; the Menu Screen label indicates the action.

4 When prompted, remove the Master Operating System disk (BxxMOS).

Master operating system software installation is complete.

Real and Protected Mode Cluster Systems

If you selected the Real Mode cluster system, the submenu shown in figure 2–11 appears in the Menu Screen. If you selected the Protected Mode cluster system, the submenu shown in figure 2–12 appears in the Menu Screen. The Menu Screen label indicates your selection.

Note: Master workstations that are running the Real Mode operating system support Real Mode cluster workstations only. The XE master supports both Real and Protected Mode operating system cluster workstations.

If you need more information about the type of workstation you have, refer to Identifying Your Workstation in section 1.

Figure 2–10 **Protected Mode Master System Submenu**

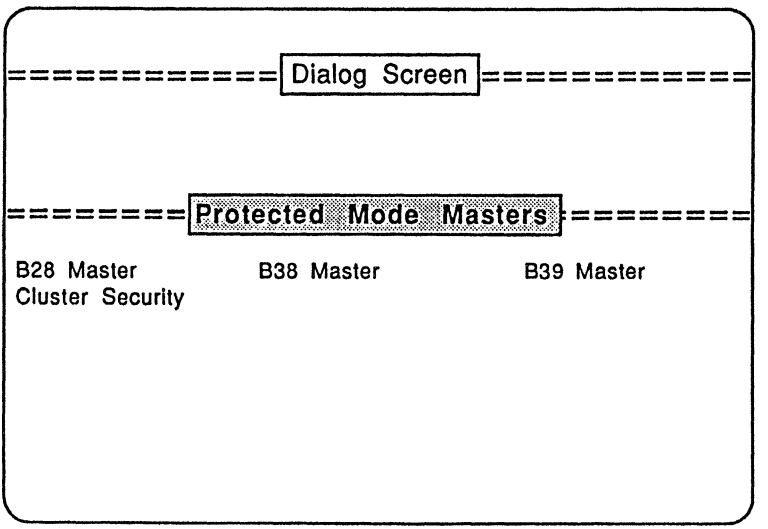


Figure 2–11 **Real Mode Cluster System Submenu**

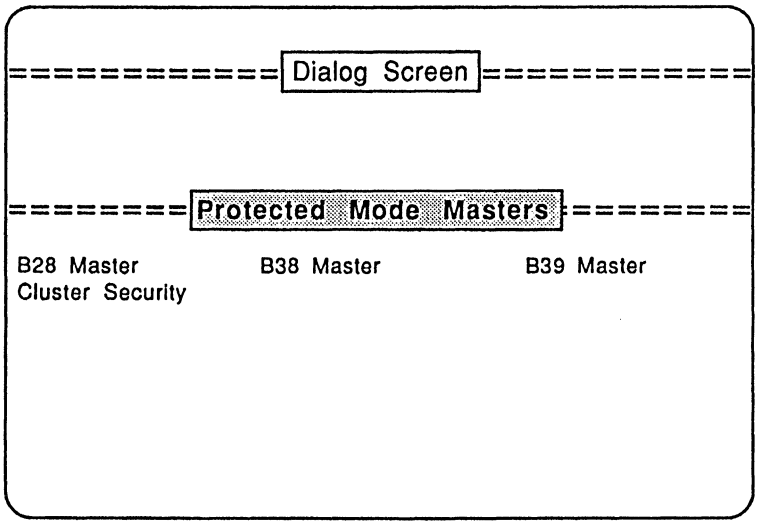
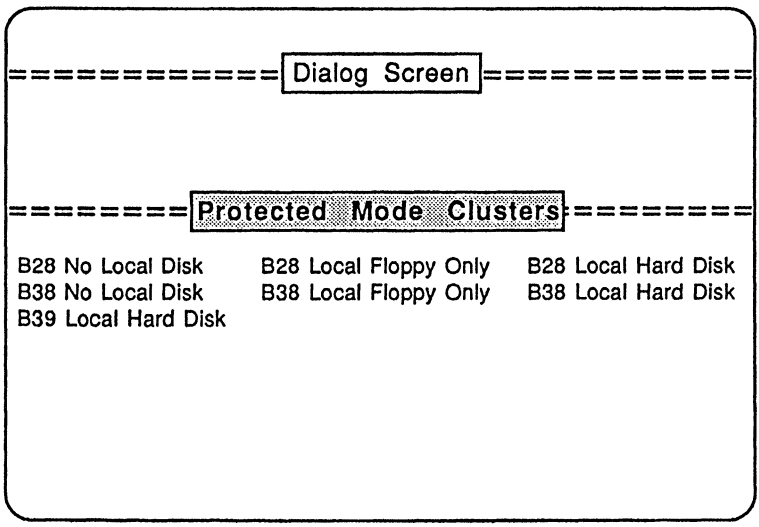


Figure 2–12 **Protected Mode Cluster System Submenu**



To select a Real Mode or Protected Mode cluster system, use the following procedure:

1 Use the arrow keys to move the cursor to your workstation type, then press **MARK**.
Note: If you need more information about the files listed in the submenus, press **HELP** after you press **MARK**.

2 Press **GO**.

3 When SIM prompts you, remove the Real Mode/Protected Mode Cluster Operating System Package disk and insert the disk indicated on the screen.

Note: Disk changes are not included here because your choice of a Real Mode or Protected Mode system determines which disk is required. Table 2–3 indicates the workstation files on each disk.

SIM copies the selected cluster system software onto the hard disk. A list of the files SIM copies is shown in the Menu Screen; the Menu Screen label indicates the action.

4 When SIM prompts you, remove the last Real Mode/Protected Mode Cluster Operating System Package disk for your system.

Cluster software installation is complete.

Installing Customizer

The Customizer Package contains the software development tools that let you generate customized operating systems on BTOS workstations. The package also contains keyboard translation files, video translation files, and the Debugger file.

For more information about the Customizer or the keyboard and video translation files, refer to your BTOS II system reference documentation. For more information about the Debug file, refer to your BTOS II Debugger programming documentation.

The package consists of six disks containing operating system build files and build libraries. Refer to your BTOS II system reference documentation for detailed information on Customizer files.

Unlike the standard software packages, Customizer is not installed using SIM. You install the Customizer Package manually, using the COPY or LCOPY command. To view a list of the files on each Customizer disk before you install them, use the FILES command. Refer to your BTOS Standard Software operations documentation for more information on the COPY or LCOPY command or the FILES command.

Note: Customizer is normally used by the experienced BTOS user. Installation procedures for the Customizer Package assume you have prior knowledge of BTOS Executive commands and command forms.

To install the Customizer Package, use the following procedure:

1 Create a directory with a maximum of 100 files to hold the Customizer software by using the CREATE DIRECTORY command. (For example, you might create the directory <gen>.)

2 Insert the first disk (B25CSX–1) of the Customizer Package in the workstation floppy disk drive (drive [f0]).

3 Use the **LCOPY** command and the wildcard feature (*) in the **FILE list** field to copy files without renaming them.

4 Press **GO**.

After copying all of the files onto the hard disk, the system displays the Executive command line.

5 Remove the first Customizer Package disk (B25CSX–1) and insert the the next disk (B25CSX–2) in the floppy dirve [f0].

6 Repeat steps 4 and 5 until you have loaded all Customizer software.

7 Submit the file InstallCmds.sub from your new directory.

Installation of workstation Customizer is complete.

Deinstalling Software

If you need to deinstall the utilities installed by SIM, you have to manually delete all software associated with the utility. You delete:

- the command to run the utility
- the run file(s) for the utility
- any associated files

You use the REMOVE COMMAND command to delete the utility's command from the system's command file.

To find the run files associated with the utility, you type the name of the utility at the Executive command field and press HELP.

You manually delete the run files and any associated files by using the DELETE command. For detailed information on commands, refer to your standard system operations documentation.

To remove the utility's command from the system command file, use the following procedure:

1. Enter **REMOVE COMMAND** at the Executive command field.

   The REMOVE COMMAND form appears.
2. Type in the name of the command you want to remove.
3. Press **GO**.

BTOS removes the command from your system.

Configuring Your Workstation

This section explains how to configure features of the system standard software to meet your special requirements. It includes:

- descriptions of configurable files
- procedures to create and modify configuration files
- procedures to configure your screen

Configuration Files

BTOS uses several text files to define the system's hardware and software configurations. The system reads these text files when BTOS is loaded into the workstation.

The types of configuration files are:

- user configuration files
- system configuration file, Config.sys
- communications device configuration files
- printer device configuration files

They are described in the following subsections.

User Configuration Files

User configuration files (or simply User files) identify each user to the system. This helps you prevent unauthorized persons from gaining access to your system. User files also allow you to customize your system for individual users or applications.

Refer to Configuring User Files for more information.

System Configuration File, Config.sys

Any workstation can maintain an optional configuration file, Config.sys, in its [Sys]<Sys> directory. For B26, B27, B28, B38, and B39 workstations, you use Config.sys to specify requirements for attached F/X-Bus modules.

Refer to Using the Config.sys File for more information.

Communications Device Configuration Files

Each device you connect to your system requires a special device configuration file that defines its characteristics. The system software provides several default configuration files, and includes a CREATE CONFIGURATION FILE command to modify a default or other existing device configuration files or create new files.

Refer to Creating Communications Device Configuration Files for more information.

Printer Device Configuration Files

Printer device configuration files allow you to configure a communications channel to interface with a parallel or serial printer. You use the CREATE CONFIGURATION FILE command to enter a new printer device configuration file or modify an existing file.

Refer to Creating Printer Device Configuration Files for more information.

Configuring User Files

You can configure your system for applications you use or for specific tasks or projects. For example, you can configure your system to bypass the Executive and activate the spreadsheet program when you sign on, or go directly to a document you are currently working on.

To perform an application exclusively (for example, word processing) you can configure the system to automatically activate the program when you sign on, and return to the SignOn form at the end of the word–processing session.

To do this, you must assign each user, application, or task a user name and create a User file for each. You can then require a user to enter a valid user name to sign on to the system.

User Names

A user name is an alphanumeric string of up to 30 characters that identifies a user (or application, or task) to the system. You can require a user to enter a valid user name in the **User name** field of the SignOn form to sign on to the system.

Each user name on your system must be different from the others. A user name becomes part of the name of a corresponding User file (refer to User File Names).

User Files

A User file is a file on the system directory that, in addition to identifying the user, specifies the software environment you want the system to activate after you sign on and after you exit from an application.

An environment is a program that has control of the system at any given time. Environments include SignOn, Executive, Context Manager, Mail Manager, utilities such as the Editor, application programs such as word processing, and userwritten applications.

A User file can include entries for files pertaining to specific applications (for example, the word processing program's Print Wheels file).

User File Names

A User file name consists of two parts:

- the name assigned to the user (refer to User Names)
- the suffix .user

For example, a user assigned the name Worker1 would have a User file named Worker1.user.

User File Entries

A User file entry consists of a keyword enclosed in colons, followed by a parameter. For example, the first entry of the typical User file in figure 3–1 consists of the keyword :SignOnExitFile: followed by the parameter [Sys]<Sys>Exec.run.

Figure 3–1 **User File (Sample)**

```
:SignOnExitFile:[Sys]<Sys>Exec.run
:SignOnChainFile;[Sys]<Sys>Exec.run
:SignOnTextFile:[Sys]<Sys>System.txt
:SignOnVolume:Sys
:SignOnDirectory:Sys
:SignOnFilePrefix:
:SignOnPassword:
:ExecCmdFile:[Sys]<Sys>Sys.cmds
:WpFormatSet:[Sys]<Sys>Wp.fmt
:WpPrinters:[Sys]<Sys>Sys.printers
:WpPrintWheels:[Sys]<Sys>Wp.whl
```

Note: The system requires the colons to read the file correctly. The system ignores an entry if it does not begin with a keyword enclosed in colons. The order in which the key word entries are listed is not important.

Each entry specifies one feature of the user configuration. For example, the fourth and fifth entries in figure 3–1, :SignOnVolume:sys and :SignOnDirectory:sys specify that both the volume and directory names are sys.

User files include SignOn entries, which specify items such as the path the system sets when you sign on, and can also include entries specifying parameters for applications such as word processing.

User File SignOn Entries

The User file SignOn entries (refer to table 3–1) specify the following items:

- the initial path
- a system password (optional)
- the Executive command file
- the initial environment (the environment that the system activates when you sign on)
- the exit environment (the environment the system activates when you exit a program or press **ACTION–FINISH**)

Table 3–1 **User File Keyword SignOn Entries**

Keyword	Parameter
:SignOnVolume:	specifies the volume in the default path
:SignOnDirectory:	specifies the directory in the default path
:SignOnFilePrefix:	specifies a file prefix in the default path
:SignOnPassword:	specifies a password required to sign on to the system
:SignOnExitFile:	specifies the run file of the environment the system loads whenever you exit an application or press ACTION–FINISH For example, to return to the Executive when you finish a session with an application, enter the Executive run file [Sys]<Sys>Exec.run.
:SignOnChainFile:	specifies the run file of the initial environment For example, to activate the Executive when you sign on, you enter the Executive run file, [Sys]<Sys>Exec.run. To bypass the Executive and activate an application, a programming language, or a BTOS utility, enter the appropriate run file.

Table 3–1 **User File Keyword SignOn Entries** (continued)

Keyword	Parameter
	If the Executive command that activates the application, programming language, or BTOS utility has a command form, you can specify one or more parameters. Use the following guidelines: □ The run file's command and parameter(s) must appear in the line(s) immediately following the SignOnChainFile entry. □ The line(s) containing the parameter(s) do not begin with a colon. □ The first parameter after the run file name must be the Executive command that activates the application, programming language, or BTOS utility. □ The parameter entries cannot include wildcard characters. □ If you are using the word–processing program to edit the file, press SHIFT–RETURN to end each line. You must remove any formatting characters. □ All parameter lines in the command form must have at least a <return> key response.
:ExecCmdFile:	specifies the Executive command file If none is specified, the system uses the default file [Sys]<Sys>Sys.cmds.

To be valid, a User file must include all of the SignOn entries that specify the default path (the path the system sets when you sign on). You can omit the parameter for file prefix and password; however, you must include the keyword.

The entry specifying the exit file is also required. The entries specifying a SignOn text file, chain file, and Executive command file are optional.

SignOn Server

The SignOn program issues a request to a SignOn Server before granting access to users. The SignOn Server decodes the SignOn form, then formats and issues a request.

If BTOS responds to the request with either the erc 31 or erc 33 error code, the SignOn Server continues with normal processing. If BTOS responds with an erc 0 error code, the SignOn Server processes the SignOn according to instructions that you write and install using the SignonLog procedural interface call. With the call, you can write the server to log SignOns and to verify access based on user names. (Refer to the *BTOS II System Procedural Interface Reference Manual.*)

If BTOS responds with any other error code, the SignOn Server rejects the user SignOn and redisplays the SignOn form.

If the server is not installed, the SignOn program operates as normal.

User File Application Entries

User files can include entries specifying parameters for applications. For example, the last three entries in figure 3–1 specify parameters for the word processing program.

Some applications have default parameters that you can change by specifying them in a User file. Others, such as the Mail Manager, require that you make entries. Refer to the application's documentation for further information.

Default User File

The system software includes a default User file, [Sys]<Sys>.user (refer to figure 3–2). In addition, some applications (for example, spreadsheet) place User files on the system directory when you install the software. (Refer to the application's documentation for further information.)

The default User file allows any user to sign on to the system without an entry in the **User Name** field of the SignOn form.

Note: To prevent unauthorized use of your system, you should delete the default file after you create the new User files for the authorized users of your system.

Figure 3–2 **Default User File [Sys]<Sys>.user**

```
:ExecCmdFile:[Sys]<Sys>Sys.cmds
:SignOnVolume:Sys
:SignOnDirectory:Sys
:SignOnFilePrefix:
:SignOnPassword:
:SignOnExitFile:[Sys]<Sys>Exec.run
```

Creating and Modifying User Files

You can use the Editor to create or modify a User file. Refer to your Standard Software operations documentation for information on the Editor.

Using the Config.sys File

You can use the Config.sys file to specify requirements for your system. Config.sys has parameter entries for all loadable system common procedures that make use of the SystemCommonConnec call (refer to your system procedural interface documentation.)

Config.sys parameters are provided in table 3–2. You can enter comments in the file. You use the ; character to start a comment on a line; you can use the # character as a token delimiter for new parameters. Note that the operating system is case–sensitive; your keywords must exactly match those shown in the table.

Table 3–2 **Config.sys Parameters**

Config.sys Parameter	Description
:ModuleType:	Module type code, in decimal, for modules (such as graphics modules) on the X–Bus or F–Bus. Refer to your system reference documentation for more information.
:XBusWindowSize:	For each module specified in :ModuleType:, you specify an X–Bus window size: 96, 224, or 480. You should check the hardware specification of the module to determine the correct size.
:UsedFromVirtualRealMode:	Specifying Yes enables real mode clients to use the X–Bus windows. (Windows are normally in upper memory.)
:ClusterLineSpeed:	Specify the communication line speed as either 1.8Mbps or 307Kbps. The default is 1.8Mbps.
:ResidentDebugger:	Only applicable to Real Mode operating systems; specifying Yes keeps the Debugger in memory for faster execution. The default is No.
:EnterDebuggerOnFault:	Specifying Yes causes an application to enter the Debugger when a fault occurs, instead of crashing the system. The default is No.
:SuppressAutoDump:	Specifying Yes suppresses running an extended crash dump after a crash. The default is No.
:SwapFile:	Specify the name of the file used by the scheduler to hold swapped–out applications. The default is [Sys] < Sys > CrashDump.sys.

Table 3–2 **Config.sys Parameters** (continued)

Config.sys Parameter	Description
:SwapFileSize:	Specify the size of the SwapFile. The default is 3000 sectors. **Note:** If you leave this parameter out, the system defaults to 3000 sectors; if you include the parameter but fail to specify a value, the system creates a SwapFile with zero sectors.
:SwapFileSizeMax:	Specify the maximum size of the SwapFile (which grows as large as needed unless you specify the size here).
:ScratchVolumeName:	Specify the name of the volume where temporary (scratch) files are created. The default is the system volume.
:VDMFile:	Allows replacing of attributes in bitmap video. The default is the [Sys] < Sys > InstallVDM.run file.
:BMAttrNormal:	(Supported on bitmap video only) The default is normal.
:BMAttrHalfBright:	(Supported on bitmap video only) The default is halfbright.
:BMAttrUnderline:	(Supported on bitmap video only) The default is underline.
Text deleted by PCN–001	
:BMAttrReverse:	(Supported on bitmap video only) The default is reverse.
:BMAttrBlinking:	(Supported on bitmap video only) The default is outline.
:BMAttrBold:	(Supported on bitmap video only) The default is bold.

Table 3–2 **Config.sys Parameters** (continued)

Config.sys Parameter	Description
:BMAttrStruck:	(Supported on bitmap video only) The default is struck.
:BMAttrHalfReverse:	(Supported on bitmap video only) The default is half.
:LfsToMaster:	Specify Yes to have the system search the master for a file when the file is not found in local storage. You must supply a full file specification without wildcards. This includes the path and file name (for example, [Sys] < Sys > file name. The default is No.
:OldStyleTEM:	(Early revisions of the Unisys teller extension module are incompatible with mode 3 X–Bus devices.)
:WakeUpInterval:	Specify a length of time after which a swapped–out application will automatically be swapped back in. If you do not enter a value, BTOS will try to swap you in to complete a chain from a background task. If you enter a zero, then BTOS will not swap you out to complete the chain. If you enter a value greater than zero, BTOS wakes up at the specified time interval and decides whether to swap or not swap a task in place of another task. The default is zero.
:OldMaster:	If your master is a B28, B38, or B39, you specify No. For another master, specifying Yes alters the cluster protocol for more efficiency. The default is No.
:CreateDirectoryProtection:	Specify if a volume password is necessary to create a new directory. The default is No.

Table 3–2 **Config.sys Parameters** (continued)

Config.sys Parameter	Description
:FileStructureVerify:	Specifying yes verifies all file system structures written to disk and causes BTOS to read all file headers, directory entries, and volume home blocks immediately after it verifies them and writes them to disk. The default is No.
:DiskRetryCount:	Specify the number of disk I/O retries before aborting an operation. The default is 12.
:DiskLogThreshold:	Specify the number of disk I/O retries. If an operation is successful below the threshold, no error is logged.
:ClusterIDCheck:	Specifying yes allows the master workstation to verify cluster connection based on the Hardware ID and the workstation hardware configuration. The default is No.
:RebootClusteronMasterDown:	Specify the hardware ID of the cluster workstation that you want BTOS to reboot when the master reboots. You repeat the parameter as many times as necessary in the master workstation's Config.sys file to indicate each cluster workstation that reboots when the master reboots.
:CursorType:	**Note:** This parameter is configurable with B28 and B38 Enhanced Video (EV) workstations only. Specify either **block** or **underline** to configure your cursor shape.
:FAllowCommlineDMAOnCPU:	Specifying Yes intializes DMA for Comm ports A and B. If you desire single–port DMA, use Comm port A. The default is No.

Table 3–2 **Config.sys Parameters** (continued)

Config.sys Parameter	Description
Config.sys Parameter	Description
:SupportPreII30Compatible:	**Note:** In BTOS II 3.0, GetpStructure cases 19 and 24 are not implemented. Calls to GetpStructure that use either case return an error. GetpStructure case 40 subsumes the former cases. Refer to the *BTOS II System Procedural Interface Reference Manual* for more information. Specify Yes if your applications use GetpStructure cases 19 and 24 and for BTOS to filter calls to GetpStructure. If you specify Yes, BTOS allocates a buffer to hold data for cases 19 and 24 at system initialization time. If you specify No or leave the parameter blank, the feature is turned off, and BTOS returns Erc 7 (Not Implemented). The default is No.

Declaring X–Bus Window Sizes

The X–Bus window is a mechanism that reserves an address space in memory for an X–Bus device to use. For example, the X–Bus window enables a program to access memory in the Graphics module.

If you use the X–Bus window, the system reserves an address region at the end of the one–megabyte process address space at system initialization. This region's size is the maximum X–Bus window size of all X–Bus modules attached to the workstation.

At system initialization, the operating system determines the module type and window size of each X–Bus module by reading [Sys]<Sys>Config.sys. For each X–Bus module containing memory that the processor can access, Config.sys should contain an entry as described in table 3–2.

If an entry is required in the Config.sys file, the installation instructions and procedures will specify the area and entry required.

The operating system knows the X–Bus window size of some modules, so entries in Config.sys are unnecessary.

Creating Communications Device Configuration Files

Your workstation incorporates three communications ports for connecting devices to your system:

- two RS–232–C ports, labeled Channel A and Channel B, for connecting one or two serial printers
- one Centronics–type port for connecting a parallel printer

Note: An optional Four–Port Communications Expander provides four additional RS–232–C ports for B26, B27, B28, B38, and B39 workstations (refer to Configuring Spooled Printers for Use with the Four–Port Communications Expander).

You use the CREATE CONFIGURATION FILE command to modify the default files provided by the system software or to create new device configuration files.

In the **Configuration file name** field, you enter a file name that includes the device name of the port you want to connect the communications device to. For example, to connect the device to Channel A, you enter [Sys]<Sys>CommAConfig.sys.

In the **Device type** field, you enter the letter **C** to specify a communications device; then you press GO to display the **Communications Parameters** subform. Refer to Communications Parameters Subform.

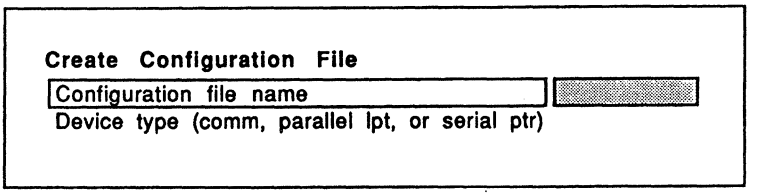
CREATE CONFIGURATION FILE Command

The CREATE CONFIGURATION FILE command allows you to create new Device Configuration files or modify existing files for the following types of devices:

- communications devices
- serial printers (direct or spooled)
- parallel printers (direct or spooled)
- magnetic tape unit

To activate this command, you type **CREATE CONFIGURATION FILE** at the Executive command line and press **RETURN**. The system displays the CREATE CONFIGURATION FILE command form (refer to figure 3–3).

Figure 3–3 **CREATE CONFIGURATION FILE Command Form**



The command form has two fields. You must enter parameters in both; use the following guidelines:

Configuration file name: Enter a new configuration file name to create a new file, or enter the name of an existing configuration file you want to modify. Use the complete file name; for example, [Sys]<Sys>filename.

Device type (comm, parallel lpt, or serial ptr): Specify the type of device you want to configure:

- Enter the letter **C** for a communications device.
- Enter the letter **P** for a parallel printer (direct or spooled).
- Enter the letter **S** for a serial printer (direct or spooled).
- Enter the letter **T** for a tape unit

When you complete the CREATE CONFIGURATION FILE command form, you press **GO**. Depending upon your entry in the **Device type** field, the system displays one of the following subforms:

- If you entered the letter **C**, the system displays the **Communications Parameters** subform (refer to figure 3–4).
- If you entered the letter **P**, the system displays the **Parallel Line Printer Parameters** subform (refer to figure 3–5).
- If you entered the letter **S**, the system displays the **Serial Line Printer Parameters** subform (refer to figure 3–6).
- If you entered the letter T, the system displays the **Tape Parameters** subform (refer to figure 3–7).

Figure 3–4 **Communications Parameters Subform**

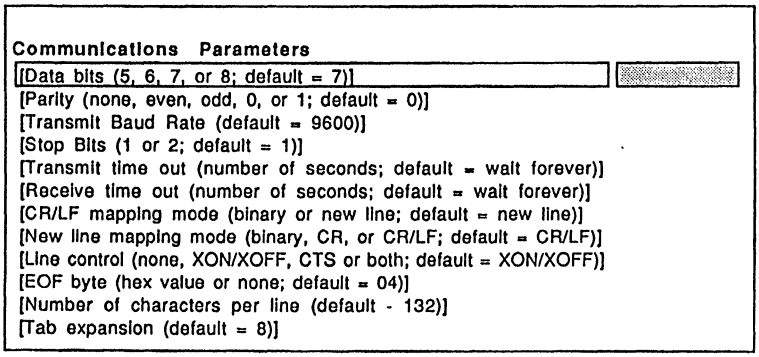

Communications Parameters
[Data bits (5, 6, 7, or 8; default = 7)]
[Parity (none, even, odd, 0, or 1; default = 0)]
[Transmit Baud Rate (default = 9600)]
[Stop Bits (1 or 2; default = 1)]
[Transmit time out (number of seconds; default = wait forever)]
[Receive time out (number of seconds; default = wait forever)]
[CR/LF mapping mode (binary or new line; default = new line)]
[New line mapping mode (binary, CR, or CR/LF; default = CR/LF)]
[Line control (none, XON/XOFF, CTS or both; default = XON/XOFF)]
[EOF byte (hex value or none; default = 04)]
[Number of characters per line (default - 132)]
[Tab expansion (default = 8)]

Figure 3–5 **Parallel Line Printer Parameters Subform**

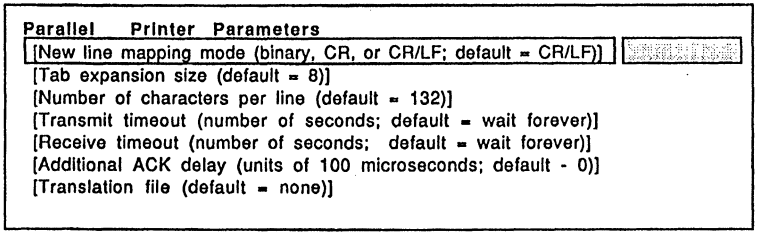

Parallel Printer Parameters
[New line mapping mode (binary, CR, or CR/LF; default = CR/LF)]
[Tab expansion size (default = 8)]
[Number of characters per line (default = 132)]
[Transmit timeout (number of seconds; default = wait forever)]
[Receive timeout (number of seconds; default = wait forever)]
[Additional ACK delay (units of 100 microseconds; default - 0)]
[Translation file (default = none)]

Figure 3–6 **Serial Line Printer Parameters Subform**

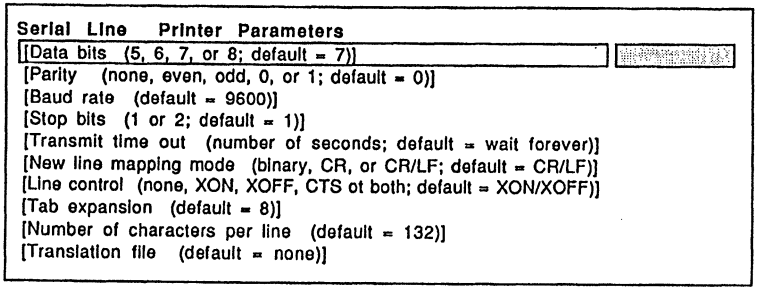
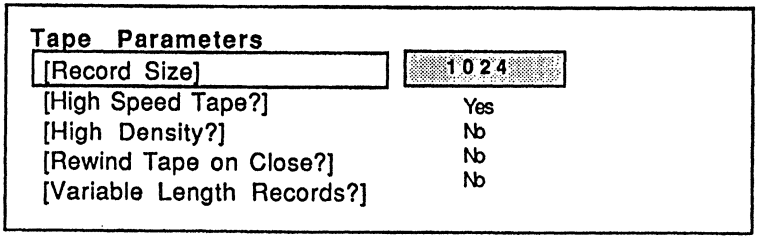

Serial Line Printer Parameters
[Data bits (5, 6, 7, or 8; default = 7)]
[Parity (none, even, odd, 0, or 1; default = 0)]
[Baud rate (default = 9600)]
[Stop bits (1 or 2; default = 1)]
[Transmit time out (number of seconds; default = wait forever)]
[New line mapping mode (binary, CR, or CR/LF; default = CR/LF)]
[Line control (none, XON, XOFF, CTS ot both; default = XON/XOFF)]
[Tab expansion (default = 8)]
[Number of characters per line (default = 132)]
[Translation file (default = none)]

Figure 3–7 **Tape Parameters Subform**



Communications Parameters Subform

The **Communications Parameters** subform (refer to figure 3–4) includes 12 optional fields (enclosed in square brackets).

You can leave any or all of these fields blank to accept the default, or enter parameters to override the defaults. (For information about the optional fields, refer to table 3–3.)

When you complete the **Communications Parameters** subform, you press **GO**. The system uses your entries to create or modify the Device Configuration file.

Table 3–3 **Communications Parameters Subform Optional Fields**

Field	Action/Explanation
[Data bits (5, 6, 7, or 8; default = 7)]	The default specifies seven data bits per character. The data bits entry does not include the parity bit if you specify even, odd, 0, or 1 parity in the following field.
[Parity (none, even, odd, 0, or 1; default = 0)]	The default specifies 0 parity (the state of the parity bit as a check on the data bits). If you specify none, you must increase the number of data bits you specify in the preceding field to compensate for the absence of a parity bit.

Table 3–3 **Communications Parameters Subform Optional Fields** (continued)

Field	Action/Explanation
[Baud Rate (up to 19200; default = 9600)]	The default specifies a transmit data rate of 9600 bits per second (bps). The system supports a baud rate between 20 and 19200 bps.Common baud rates are 110, 150, 300, 1200, 2400, 4800, and 9600.
[Stop bits (1 or 2; default = 1)]	The default specifies 1 stop bit per character. You should specify 2 when transmitting at 300 baud or below in RS–232C asynchronous mode.
[Transmit time out (number of seconds; default = wait forever)]	Transmit time out is the time in seconds a Write operation waits to begin transmitting a character before returning Status Code 300 and the message, Device not ready. The default specifies no time limit for transmit time out.
[Receive time out (number of seconds; default = wait forever)]	Receive time out is the time in seconds a Read operation waits to receive a character before returning Status Code 602 and the message, No character available. The default specifies no time limit for receive time out. If you enter 0 and no character is currently available, the Read operation immediately returns Status Code 602.
CR/LF mapping mode (binary or new line; default = new line)]	This entry specifies the mapping of incoming carriage returns (CR) and linefeeds (LF). The default maps an incoming single carriage return (CR), single line feed (LF), or CR/LF combination into a BTOS RETURN (0Ah). If you enter binary, the system does not map incoming CRs or LFs.

Table 3–3 **Communications Parameters Subform Optional Fields** (continued)

Field	Action/Explanation
[New line mapping mode (binary, CR, or CR/LF; default = CR/LF)]	This entry specifies the mapping of outgoing BTOS system RETURNs (0Ah). The default maps an outgoing RETURN into an ASCII CR/LF (0Dh/0Ah). If you enter CR, the system maps an outgoing RETURN into an ASCII CR (0Dh). If you enter binary, the system does not map outgoing RETURNS.
[Line control (none, XON/XOFF, CTS or both; default = XON/XOFF)]	This entry specifies the line control mode that the receiving device uses to control the data flow. If you accept the default, the receiving device suspends transmission from the time the device receives an XOFF control character (13h) until it receives an XON control character (11h). If you enter none, the receiving device has no line control. If you enter CTS (Clear To Send), the receiving device suspends transmission when it does not receive the CTS signal. If you enter both, the receiving device suspends transmission if it receives an XOFF control character or if it does not receive a CTS signal.
[EOF byte (hex value or none; default = 04)]	This entry specifies the hexadecimal value the system uses to detect the end of the input file. The default is 04 (the ASCII code for the EOT (End Of Transmission) character. If you enter none, a communication byte stream never returns Status Code 1 (End of file).

Table 3–3 **Communications Parameters Subform Optional Fields** (continued)

Field	Action/Explanation
[Number of characters per line (default = 132)]	This entry specifies the maximum number of characters in a printed line. The default is 132 characters per line. The system supports a maximum of 255 characters per line.
[Tab expansion (default = 8)]	This entry specifies the number of blanks the system maps into a BTOS TAB character. The default is eight characters between tabs.

Creating Printer Device Configuration Files

To configure a communications channel to interface with a parallel or serial printer, you use the CREATE CONFIGURATION FILE command. You enter a new Printer Device Configuration file or modify an existing file. (Refer to CREATE CONFIGURATION FILE Command.)

Printer Device Names

For your system to identifiy channels with printers connected, and to associate a printer with its channel, you configure each channel with a different Printer Device Name. You enter a file name that includes a Printer Device Name in the **Configuration file name** field, in the appropriate format:

- for connecting direct printers, you enter
  [Sys]<Sys>xxxxxConfig.sys
  where **xxxxx** is the Printer Device Name
- for connecting spooled printers, you enter
  [Sys]<SPL>yyyyyConfig.sys
  where **yyyyy** is the Printer Queue Name

A Printer Device Name can be any character string up to a maximum of 40 characters; however, it is recommended that you follow the naming conventions in table 3–4.

When you configure a custom spooled printing system for a cluster, it is recommended that you assign the names MASTER, WS1, WS2, WS3, and so on to the workstations. When you enter Printer Device Configuration files for the communications channels of workstations other than the master, you should prefix the name of the workstation to the Printer Device Name. For example:

- WS1SPLB is the Printer Device Name for connecting a printer to Channel B of workstation WS1.
- WS2SPL1C is the Printer Device Name for connecting a printer to Channel C of the first Four–Port Communications Expander on workstation WS2.

Table 3–4 **Recommended Printer Device Names**

Printer Device Name			
Direct	**Spooled**	**Type of Printer**	**Channel**
1. Printers connected to the workstation's ports			
Lpt	SPL	Parallel	Centronics port
PtrA	SPLA	Serial	Channel A
PtrB	SPLB	Serial	Channel B
2. Printers connected to the first Four–Port Communications Expander			
Ptr1A	SPL1A	Serial	Channel A
Ptr1B	SPL1B	Serial	Channel B
Ptr1C	SPL1C	Serial	Channel C
Ptr1D	SPL1D	Serial	Channel D
3. Printers connected to the second Four–Port Communication Expander:			
Ptr2A	SPL2A	Serial	Channel A
Ptr2B	SPL2B	Serial	Channel B
Ptr2C	SPL2C	Serial	Channel C
Ptr2D	SPL2D	Serial	Channel D

Parallel Line Printer Parameters Subform

The **Parallel Line Printer Parameters** subform (refer to figure 3–5) includes six optional fields (enclosed in square brackets).

You can leave any or all of these fields blank to accept the default, or enter parameters to override the defaults. (For information about the optional fields, refer to table 3–5.)

When you complete the **Parallel Line Printer Parameters** subform, you press **GO**. The system uses your entries to create or modify the Device Configuration file.

Table 3–5 **Parallel Line Printer Parameters Subform Optional Fields**

Field	Action/Explanation
[New line mapping mode (binary, CR, or CR/LF; default = CR/LF)]	This entry specifies the mapping of outgoing RETURNs (0Ah). The default maps an outgoing RETURN into an ASCII CR/LF (0Dh/0Ah). If you enter CR, the system maps an outgoing RETURN into an ASCII CR (0Dh). If you enter binary, the system does not map outgoing RETURNs.
[Tab expansion size (default = 8)]	This entry specifies the number of blanks the system maps into a BTOS TAB character. The default is eight characters between tabs.
[Number of characters per line (default = 132)]	This entry specifies the maximum number of characters in a printed line. The default is 132 characters per line.

Table 3–5 **Parallel Line Printer Parameters Subform Optional Fields** (continued)

Field	Action/Explanation
[Transmit time out (number of seconds; default = wait forever)]	Transmit time out is the time in seconds a Write operation waits to begin transmitting a character before returning Status Code 300 and the message, Device not ready. The default specifies no time limit for transmit time out. It is recommended that you enter 60 in this parameter if you are configuring an AP1302, AP1303, AP1305, AP1311, AP1314, AP1351, AP1354, AP9208, or AP9215 parallel line printing device.
[Receive time out (number of seconds; default = wait forever)]	Receive time out is the time in seconds a Read operation waits to receive a character before returning Status Code 602 and the message, No character available. The default specifies no time limit for receive time out. If you enter 0 and no character is currently available, the Read operation immediately returns Status Code 602.
[Additional ACK delay (units of 100 micro–seconds; default = 0)]	The system sends a character to the printer 10–20 microseconds after receiving the falling edge of an ACK (acknowledgment) signal from it. Specify the additional time delay if your printer uses a longer ACK signal.
[Translation file (default = none)]	This entry specifies a translation file to translate characters that appear on your screen into different characters when you print a document. (You must specify the volume and directory in which the translation file resides.)

Serial Line Printer Parameters Subform

The **Serial Line Printer Parameters** subform (refer to figure 3–6) includes 10 optional fields (enclosed in square brackets). You can leave any or all of these fields blank to accept the default, or enter parameters to override the defaults. (For information about the optional fields, refer to table 3–6.)

When you complete the **Serial Line Printer Parameters** subform, you press **GO**. The system uses your entries to create or modify the Device Configuration file.

Table 3–6 **Serial Line Printer Parameters Subform Optional Fields**

Field	Action/Explanation
[Data bits (5, 6, 7, or 8; default = 7)]	The default specifies seven data bits per character. The data bits entry does not include the parity bit if you specify even, odd, 0, or 1 parity in the following field.
[Parity (none, even, odd, 0, or 1; default = 0)]	The default specifies 0 parity (the state of the parity bit as a check on the data bits). If you specify none, you must increase the number of data bits you specify in the preceding field to compensate for the absence of a parity bit. It is recommended that you enter Even in this parameter if you are configuring an AP1302, AP1303, AP1305, AP9208, or AP9215 serial line printing device.
[Baud rate (up to 19200; default = 9600)]	The default specifies a transmit data rate of 9600 bits per second. The system supports a baud rate between 20 and 19200 bps. Common baud rates are 110, 150, 300, 1200, 2400, 4800, and 9600. It is recommended that you enter 1200 in this field if you are configuring an AP1302 or AP1303 serial line printing device.

Table 3–6 **Serial Line Printer Parameters Subform Optional Fields** (continued)

Field	Action/Explanation
[Stop bits (1 or 2; default = 1)]	The default specifies one stop bit per character. You should specify 2 when transmitting at 300 baud or below in RS–232C asynchronous mode.
[Transmit time out (number of seconds; default = wait forever)]	Transmit time out is the time in seconds a Write operation waits to begin transmitting a character before returning Status Code 300 and the message, Device not ready. The default specifies no time limit for transmit time out. It is recommended that you enter 60 in this parameter if you are configuring an AP1302, AP1303, AP1305, AP9208, or AP9215 serial line printing device.
[New line mapping mode (binary, CR, or CR/LF; default = CR/LF)]	This entry specifies the mapping of outgoing BTOS RETURNs (0Ah). The default maps an outgoing RETURN into an ASCII CR/LF (0Dh/0Ah). If you enter CR, the system maps an outgoing RETURN into an ASCII CR (0Dh).
[Line control (none, XON/XOFF, CTS, or both; default = XON/XOFF)]	This entry specifies the line control mode that the receiving device uses to control the data flow. If you accept the default, the receiving device suspends transmission from the time the device receives an XOFF control character (13h) until it receives an XON control character (11h). If you enter none, the receiving device has no line. If you enter CTS (Clear To Send), the receiving device suspends transmission when it does not receive the CTS signal.

Table 3–6 **Serial Line Printer Parameters Subform Optional Fields** (continued)

Field	Action/Explanation
	If you enter both, the receiving device suspends transmission if it receives an XOFF control character or if it does not receive a CTS signal. It is recommended that you enter Both if you are configuring an AP1302, AP1303, AP1305, AP9208, or AP9215 serial line printing device.
[Tab expansion size (default = 8)]	This entry specifies the number of blanks the system maps into a BTOS TAB character. The default is eight characters between tabs.
[Number of characters per line (default = 132)]	This entry specifies the maximum number of characters in a printed line. The default is 132 characters per line.
[Translation file (default = none)]	Specifies a translation file to translate characters that appear on your screen into different characters when you print a document. You must specify the volume and directory in which the translation file resides.

Tape Parameters Subform

To configure a communications channel to interface with a tape drive unit, you use the CREATE CONFIGURATION FILE command. You enter a new tape device configuration file or modify an existing file. For information about the optional fields, refer to table 3–7.

Table 3–7 **Tape Parameter Subform Optional Fields**

Field	Action/Explanation
Record Size [10240]	This is the record size for fixed–length records and the maximum size for variable–length records. BTOS uses only even–value record sizes. The maximum value it uses is 16384 (16 Kb).
High Speed Tape [Yes]	If you accept the default, the tape travels at 100 IPS (inches per second); enter no for 25 IPS. System configuration changes are needed to use high speed tape.
High density mode [No]	Unisys does not support this parameter. The default is Single–Density mode, which you cannot override.
Rewind Tape on Close [Yes]	Enter no to stop the tape from automatically rewinding when a tape operation is completed.
Variable Length Records [No]	Enter yes if you want to specify different record sizes in different tape requests.

Configuring the Four–Port Communications Expander

The Four–Port Communications Expander allows you to connect additional serial printers and communications devices to B26, B27, B28, B38, B39 workstations. Each Four–Port Communications Expander provides four additional RS–232C ports. You can have a maximum of two Communications Expanders on a workstation.

The system software includes the DataComm Server, a system service required to operate the Four–Port Communications Expander. The DataComm Server must be installed on the workstation where the Four–Port Communications Expander is connected for the expander to function.

Device Naming Conventions

The system assigns a default name to each of the ports on the Communications Expander(s) you install on your workstation. This allows the system to identify the devices you connect to the ports.

The default names of the ports on the first Communications Expander are 1A, 1B, 1C, and 1D.

If you add a second Communications Expander, the default names of the ports are 2A, 2B, 2C, and 2D.

When you connect a printer or communications device to one of the ports, you assign the device a name using the default name of the port you connect it to. You assign a name to a device when you create its Device Configuration file. For example, a serial printer connected to port 1A in a direct printing system would be [Ptr]1A; a communications device connected to port 2B would be [Comm]2B.

Configuring Spooled Printers for Use with the Four–Port Communications Expander

To configure the Spooler for printers connected to a Four–Port Communications Expander, you must add entries to the Spooler Configuration file and the Queue Index file.

For example, to configure the Spooler for a printer connected to port A of the first Communications Expander on your system, you make the following entries:

- Spooler Configuration file:
  1A/C1A/SPL1A/[Sys]<SPL>SPL1AConfig.sys/130/n
- Queue Index file:
  SPL1A/[Sys]<SPL>SPL1A.queue/1/1
  C1AControl/[Sys]<SPL>C1AControl.queue/1/1

Accessing the Four–Port Communications Expander

To access the Four–Port Communications Expander, you must install the DataComm Server system service each time you start up your system. You can install the DataComm Server manually, or you may be able to use a special file to install it automatically (refer to your Standard Software operations documentation).

Configuring Your Screen

You can configure the screen to your needs by changing characteristics such as length, width, color (on color workstations), reverse video, timeout, and scrolling capability. The SCREEN SETUP command allows you to change all these attributes, while the VIDEO command allows changes to screen attributes you use most often.

SCREEN SETUP Command

The SCREEN SETUP command allows you to change one or more screen characteristics. The attributes you set remain in effect until you reset them or log out of the Executive. The screen characteristics you can change include:

- length of screen
- width of screen
- default color (color workstations only)
- reverse video
- scrolling capabilities
- screen timeout
- cursor shape and visibility
- background color

To activate this command, you type **SCREEN SETUP** at the Executive command line. If you press **GO**, the system sets all the screen attributes to the default values. To change one or more screen attributes, you press **RETURN**. The system displays the SCREEN SETUP command form shown in figure 3–8.

The SCREEN SETUP command form has ten optional fields (enclosed in square brackets). You can leave any or all of these fields blank to accept the defaults or enter parameters to override the defaults. (For information about each optional field, refer to table 3–8.)

Figure 3–8 **SCREEN SETUP Command Form**

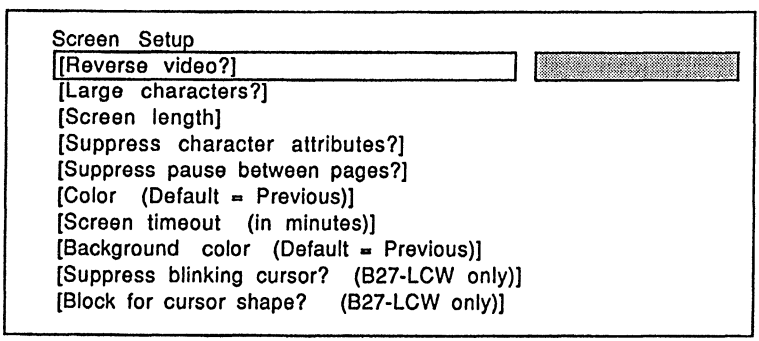


Table 3–8 **SCREEN SETUP Command Optional Fields**

Field	Action/Explanation
[Reverse video?]	The default is no; the system displays light characters on a dark background. To display dark characters on a light background, enter **y**.
[Large characters?]	This field applies only to B27 workstations that have wide screen capabilities. The default is no; the system sets the screen width at 132 columns. To set the screen width at 80 columns, enter **y**.
[Screen length]	The default sets the screen length at full screen. The number of lines required for a full screen display varies, depending on the workstation you are using. To specify the screen length, enter the desired length in number of lines. To display a shorter screen, enter a number between 10 and 34. If you specify a screen length less than full screen, the amount of memory the screen uses is reduced.
[Suppress character attributes?]	The default is no; the system does not suppress character attributes and the command form parameter fields remain in reverse video. To suppress character attributes and eliminate the reverse video highlight from command form parameter fields, enter **y**.
[Suppress pause between pages?]	The default is no; the system prompts you to press NEXT PAGE before scrolling any information off the screen. To suppress a pause between pages displayed on the screen, enter **y**.

Table 3–8 **SCREEN SETUP Command Optional Fields** (continued)

Field	Action/Explanation
[Color (Default = Previous)]	This field applies to color workstations only. The system sets this parameter to the color you specified most recently. To specify a color other than green, enter the name of the color. Other available colors are white, blue, yellow, and amber.
[Screen timeout (in minutes)]	The screen timeout feature turns the screen off automatically when you do not enter characters for a specified number of minutes. You can turn the screen back on by pressing any key. The default does not use the screen timeout feature; the screen remains on as long as the workstation is on. To use the screen timeout feature, enter the number of minutes delay after an entry before the system turns off the screen.
[Background color? (Default=Previous)]	The default is the previous color.
[Suppress blinking cursor? (B27 LCW only)]	This option is available only on screens with programmable cursors, like the B27 Low Cost Workstation (LCW). The default is no.
[Block for cursor shape? (B27 LCW only)]	This option is available only on screens with programmable cursors, like the B27 LCW. The default is no.

When you complete the SCREEN SETUP command form, you press **GO** to activate the command. The system sets the screen attributes according to your specifications.

VIDEO Command

The VIDEO command allows you to change screen characteristics:

- scrolling capabilities
- screen timeout
- default color (color workstations only)
- screen width (B27 workstations only)

To activate this command, you type **VIDEO** at the Executive command line. If you press **GO**, the system sets all the screen characteristics to the default values. To change one or more screen attributes, you press **RETURN**. The system displays the VIDEO command form shown in figure 3–9.

The VIDEO command form has four optional fields enclosed in square brackets. You can leave any or all of these fields blank to accept the defaults or enter parameters to override the defaults. (For information about each optional field, refer to table 3–9.)

Figure 3–9 **VIDEO Command Form**

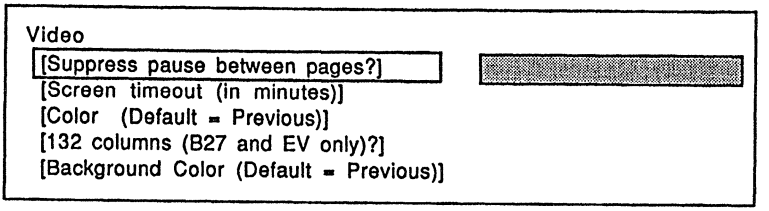

Video
[Suppress pause between pages?]
[Screen timeout (in minutes)]
[Color (Default = Previous)]
[132 columns (B27 and EV only)?]
[Background Color (Default = Previous)]

Table 3–9 **VIDEO Command Optional Fields**

Field	Action/Explanation
[Suppress pause between pages?]	The default is no; the system prompts you to press NEXT PAGE or SCROLL UP before scrolling any information off the screen. To suppress a pause between pages displayed on the screen, enter **y**.

Table 3–9 **VIDEO Command Optional Fields**

Field	Action/Explanation
[Screen timeout (in minutes)]	The screen timeout feature turns the screen off automatically when you do not enter characters for a specified number of minutes. You can turn the screen back on by pressing SHIFT. The default does not use the screen timeout feature; the screen remains on as long as the workstation is on. To use the screen timeout feature, enter the number of minutes delay after an entry before the system turns the screen off.
[Color (default = previous)]	This field applies to color workstations only. The system sets this parameter to the color you specified most recently. To specify a color other than green, enter the name of the color. Other available colors are white, blue, yellow, and amber.
[132 Columns (B27 and EV only)]	This field applies only to B27 and Enhanced Video (EV) workstations that have wide screen capabilities. The default is no; the system sets the screen width at 80 columns. To set the screen width at 132 columns, enter y.
[Background Color (Default = Previous)	This field applies to color workstations only. The system sets this parameter to the color you specified most recently. To specify black, white, blue, yellow, or amber, enter the name of the color.

When you complete the VIDEO command form, you press **GO** to activate the command. The system sets the screen attributes according to your specifications.

Optimizing Workstation Performance

Once you have configured your system to fit your specific software or hardware requirements, you can enhance your workstation's performance by using the procedures described in this section. Specifically, this section tells you how to:

- use intitialization files
- improve program scheduling
- improve file access throughput
- improve communications
- improve print scheduling
- maintain your workstation

For detailed information on BTOS, refer to your System Reference documentation or your Standard Software operations documentation.

Using Initialization Files

During the beginning of program execution, BTOS ensures that all indicators and constants are set to prescribed conditions and values. You can alter them for programs (for example, system services) to be installed in memory by configuring an initialization file, Sysinit.Jcl.

Configuring the Sysinit.Jcl File

You use the Sysinit.Jcl file to drive the Batch Job Control. Batch Job Control operates much like the BTOS submit file facility, except that it provides more options and has a different syntax. For information on the submit facility and submit files, refer to your Standard Software operations documentation and your System Reference documentation.

BTOS looks for three files to invoke the Batch Job Control:

- Sysinit.Jcl file
- Sysinit.Run file.
- Batch.Run file.

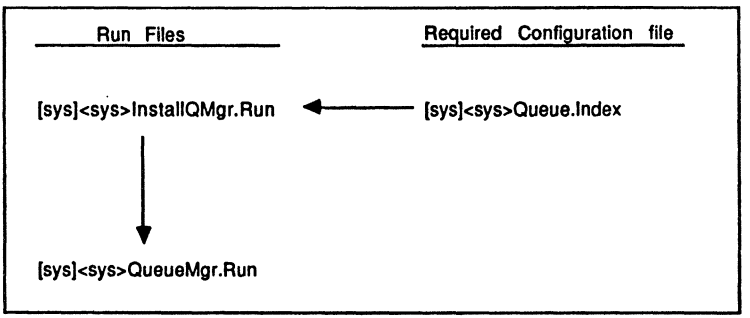
Standalone and master workstations look for [sys]<sys>SysInit.Txt and [sys]<sys>SysInit.Jcl files.

Cluster workstations look for the [sys]<sys>Wsxxx>SysInit.Jcl file or [sys]<sys>Hwxxx>SysInit.Jcl file.

If your system has security enabled (refer to section 9), BTOS looks for the [Sys]<sys>Hwxxx>SysInit.Jcl file first and checks the Hardware ID number xxx for validity.

BTOS needs these files, along with the [sys]<sys>SysInit.Run and Batch.Run file, to invoke the Batch Job Control (refer to figure 4–1).

Figure 4–1 **Relationship of Files for Batch Job Control**



Before you use the SysInit.Jcl files to install software into memory, verify that the programs you install do not depend upon other programs being installed in memory as well. (For example, you install XBIF along with Telephone Server to successfully run the BTOS Voice features.)

For most system services, you use only three Batch commands. To implement error handling or other options, refer to your Batch documentation. The three commands you use are: **$JOB, $RUN,** and **$END.** A comma separates the parameters for **$JOB** and **$RUN** commands as follows:

$JOB (jobname), (user file name), (password)
$RUN (run file specification), (parameters)
$END

An explanation of the parameters for each command is provided in table 4–1.

Table 4–1 **Batch Command Parameters**

Parameter	Explanation/Action
jobname	Starts a job. The convention is SysInit.
user file name	User file used for path and password information. If none is used, then no path is defaulted.
password	Supply the password of the user file (if needed).
run file specification	Specify the full file specification (volume, directory and file).
parameters	Commas separate run file parameters. To have a blank parameter, use two consecutive commas.

If you use the SysInit.Jcl file to install a program, be sure to install all software that accompanies the program.

The following is an example of a SysInit.Jcl file to install Queue Manager, Spooler with a personalized configuration file, and ISAM with two users and the default ISAM configuration file.

```
$JOB SysInit
; A semicolon starts a comment until
; either line feed or a dollar sign is
; encountered
$RUN [Sys]<Sys>InstallQMgr.Run
$RUN [Sys]<Sys>InstallSpl.Run,
       [Sys]<Config>DanCnfg.sys
$RUN [Sys]<Sys>ISAMServer.Run, 2
$END
```

If you do not want to install Queue Manager and Spooler for a temporary time, configure the same example SysInit.Jcl file as:

```
$JOB SysInit
;RUN  [Sys]<Sys>InstallQMgr.Run
;RUN  [Sys]<Sys>InstallSpl.Run,
       [Sys]<Config>DanCnfg.sys
$RUN  [Sys]<Sys>ISAMServer.Run, 2
$END
```

Improving Noninteractive Program Scheduling

You can improve your system's throughput by scheduling programs. Your workstation is processing two types of programs: interactive and noninteractive.

Interactive programs function under a continuous dialog between you and BTOS; each entry you make in the program normally elicits a response from BTOS. Examples of interactive programs are:

- Basic Interpreter
- SWP or OFIS Designer
- Editor
- Multiplan
- interactive update programs
- data entry programs
- PC Emulator

Most interactive programs access the master workstation's disk sporadically. If only interactive programs are running at the same time, it is unlikely that two programs need access to the disk at the same time.

Noninteractive programs do not have extensive user dialogs, but use the disk intensely. Examples of noninteractive programs and jobs are:

- batch update applications
- long-spooled jobs
- file transfers

- compilers and linkers
- floppy copies
- JCL–controlled jobs

If you schedule noninteractive programs to run when interactive programs are not running, you speed up the processing of both the interactive and the noninteractive programs. In addition, if you schedule no more than three noninteractive programs to run at a time, the disk is busy, but is not backed up with I/O requests.

You use Batch or Context Manager to schedule your noninteractive programs. Refer to your Batch reference documentation or your Context Manager documentation for details on scheduling programs.

Improving File Access Throughput

You can improve your system's performance by improving your file access throughput. You improve the throughput by:

- relocating files
- upgrading clusters with local file storage
- cutting down on disk fragmentation
- varying IVOLUME parameters

Relocating Files

You improve your file access throughput by relocating files from a floppy disk to a hard disk or if you have a cluster with local file storage, by relocating files from the master's hard disk to your local hard disk. A hard disk works much faster than a floppy disk; a local hard disk works faster over communication lines than the master's hard disk.

You use the **COPY** command to copy files from your floppy disk to the hard disk and from the master's hard disk to your local hard disk. (Refer to your Standard Software operations documentation for details on the **COPY** command.)

If you have a cluster workstation with local storage, but do not have enough hard disk space available to boot locally, you can store nonshared data files on your local hard disk. You can also customize your workstation operating system to allow your local hard disk (not the SYS volume) to be the Scratch Volume [Scr].

Upgrading Clusters With Local File Storage

Note: This option requires approximately 10MB more disk space.

You can upgrade clusters with local file storage to boot locally to enhance performance. This automatically changes the location of the [Scr] volume to the workstations local disk. It also reduces the traffic on the cluster line as you take code files and overlays from the local hard disk.

Cutting Down on Disk Fragmentation

You can improve your file accessing throughput by making your disk operate more efficiently. You use the BACKUP VOLUME, IVOLUME, and RESTORE commands to cut down on disk fragmentation (extents or runs per file) and checkerboarding. (Refer to the Glossary.)

For information on BACKUP VOLUME, IVOLUME, and RESTORE procedures, refer to Maintaining Your Workstation; for more information on commands, refer to your Standard Software operations documentation.

By decreasing fragmentation and checkerboarding, you reduce the amount of system structures that the BTOS file system has to maintain. You also allow faster access in reading your files. Your system works more efficiently if it can read a disk file contiguously.

Varying IVOLUME Parameters

You can also make your disk operate more efficiently by optimizing parameters when using the IVOLUME command (refer to appendix C). The IVOLUME utility calculates the maximum number of files by multiplying the number you enter in the **[max files]** parameter by 1.5. You enter a number in this parameter that allows your SYS directory to be 80% full. System performance degrades if the SYS volume is fuller than that.

You answer Yes to the **[Details]** field in the VOLUME STATUS command form to determine the number of files you presently have on the SYS volume and the number of files in the SYS directory. (Refer to your Standard Software operations documentation for more information on the VOLUME STATUS command.)

You multiply the number of files in the SYS directory by 1.25, then round up to the nearest whole number. You then take the maximum number of files on the volume and multiply it by 0.8, allowing a 20% growth factor.

Improving Print Scheduling

You use the Spooler utility to help with throughput on your workstation. Spooler allows multiple workstations to share a printer and to print at the same time. This is because Spooler prohibits you from printing directly; it copies the output into a file which is 'spooled' to the printer when it is available. For Spooler procedures, refer to section 8.

If your workstation is in a cluster system, you can improve your print scheduling by putting the spooled printer on the master workstation. The output to Spooler then goes through the cluster communication line only once.

Improving Communications

To improve communications among the master and cluster workstations:

- Dedicate the master to performing system services (for example, servicing the cluster).
- Balance cluster lines by putting the same number of workstations on each line.
- Use terminators and standard cables to reduce/eliminate line errors.
- Upgrade your master workstation to a B28, B38, or B39 workstation. This provides a 30% cluster performance increase.

For more information on managing clusters, refer to section 9.

Maintaining Your Workstation

You maintain optimum performance on your workstation by backing up data files and archiving files. You should use one of these options at least once a week or whenever you add a significant amount of data to your hard disk.

Backing Up Data Files

You back up data stored on disks by making copies of the disks on workstations that have one or more floppy disk drives. If the master disks are damaged, the data is available on the copy. You use the FLOPPY COPY command to copy disks.

The FLOPPY COPY command duplicates the contents of a disk to another disk. You can make multiple copies.

On workstations with a hard disk and one floppy disk drive, the system sets up a temporary file on the hard disk ([Scr]<$>FloppyCopy.tmp). In this file, the system temporarily stores information from the master disk and then copies the information to a new disk you insert in the floppy disk drive.

You use the IVARCHIVE command to prepare the disks for a backup. (Refer to Archive Files.)

Once your disk is archived, you you have two backup options:

- You can use the BACKUP VOLUME command to copy all files from the hard disk onto the disks.
- You can use the SELECTIVE BACKUP command to copy only selected files from the hard disk onto the disks.

Both of these commands copy the files you want to back up into an archive file. The archive file is a read-only file; you cannot edit it. The system uses the archive file with the BACKUP VOLUME, SELECTIVE BACKUP, and RESTORE commands only.

For more information on the these commands, refer to your Standard Software operations documentation.

Archive Files

An archive file is data used to back up a hard disk or floppy disks. The data consists of disks with the same volume name and numeric suffixes. Before you back up the hard disk, you must initialize a supply of disks for the archive files.

The system uses archive files with the BACKUP VOLUME, SELECTIVE BACKUP, and RESTORE commands only. To prepare disks for use as archive files, you use the IVARCHIVE command in conjunction with the IVOLUME command. IVARCHIVE formats the disk, performs write/read tests to identify surface defects, writes volume control structures onto the disk, and creates system files.

Note: You must start your backup operation with enough disks; you cannot stop in the middle to initialize more.

To make sure you initialize enough disks to hold all the files you want to back up, you determine the approximate number you need by using the FILES command. In the **[Details?]** field of the FILES command form, you enter y. The system displays the number of sectors each file uses; you then calculate the disks as follows:

- For 5–1/4–inch disks, you divide this number by 1000 to determine the approximate number of disks you need.

If there is a remainder, you prepare an extra disk for the remaining sectors.

The IVARCHIVE command allows you to initialize disks for use as archive volumes. (For more information on this command, refer to your Standard Software operations documentation.)

Restoring Files

You restore files onto a volume from an archive disk created with the BACKUP VOLUME command or with the SELECTIVE BACKUP command. You can use the IVOLUME command to reinitialize the volume you want the files restored on, or the volume can already have files on it. You use the RESTORE command to restore files to a volume (refer to your Standard Software operations documentation.)

Installing XE Master System Software

This section provides procedures to:

- handle QIC and half–inch tapes
- start up the XE master
- initialize the XE master hard disk
- format a new or corrupted hard disk
- install XE operating system on the XE master
- install standard workstation software on the XE master

Installation Restrictions

The workstation you use during installation must have a floppy disk drive and must be connected to the first Cluster Processor (CP00) in the XE master.

If you are loading software from half–inch tape, the tape drive must be connected to the first DP board as the Master Processor (DP00). If your system does not have a DP board, you use QIC tape.

These workstation and tape drive restrictions are necessary because the system recognizes only the first processor of each processor type during certain parts of the installation and implementation procedures.

Using QIC Tapes

QIC tapes provide you with portable media on which to store information. On the XE master, they also provide you with the source for the initial system software and for future software updates. You can also use them as backup storage devices.

Handling QIC Tapes

When handling QIC tapes, remember the following:

- Do not touch or manually move the magnetic tape inside the cartridge.
- Store cartridges in their cases in a dry area at room temperature. Unlike half-inch tapes, it is not necessary to store QIC tapes vertically.
- Keep QIC tapes away from magnetic devices, such as CRT screens.

Under certain conditions, you should pack (rewind) the QIC tape to ensure that the tape operates properly during I/O operations. If any of the following conditions apply, use the mQIC RETENSION command to rewind the QIC tape before using it:

- excessive read/write errors (more than 50 recoverable errors per pass)
- exposure of the cartridge to temperatures outside the range of 40oF to 110oF (5oC to 44oC)
- prolonged cartridge storage (more than two weeks)
- physical shock to the cartridge (such as dropping it or dropping something on it)

For information on executing the mQIC RETENSION command, refer to Retensioning a QIC Tape in this section.

Figure 5–1 shows the components of a QIC tape. Figure 5–2 shows the positions of the write-protect plug for enabling and disabling write operations to the tape.

Operating the QIC Tape Drive

You control the QIC tape drive using the front slide lever and the cartridge slot (shown in figure 5–3).

The front slide lever locks the QIC tape in the drive. The red indicator light on the right side of the drive is on whenever the system is retrieving or storing information.

Caution: Do not push the front slide lever when the indicator light is on; you could interrupt a write operation to the tape.

Figure 5–1 **Components of a QIC Tape**

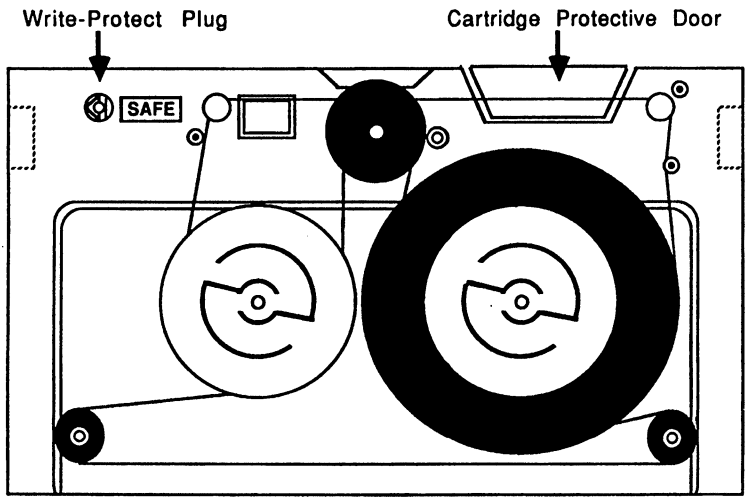


Figure 5–2 **QIC Tape Write–Protect Plug Positions**

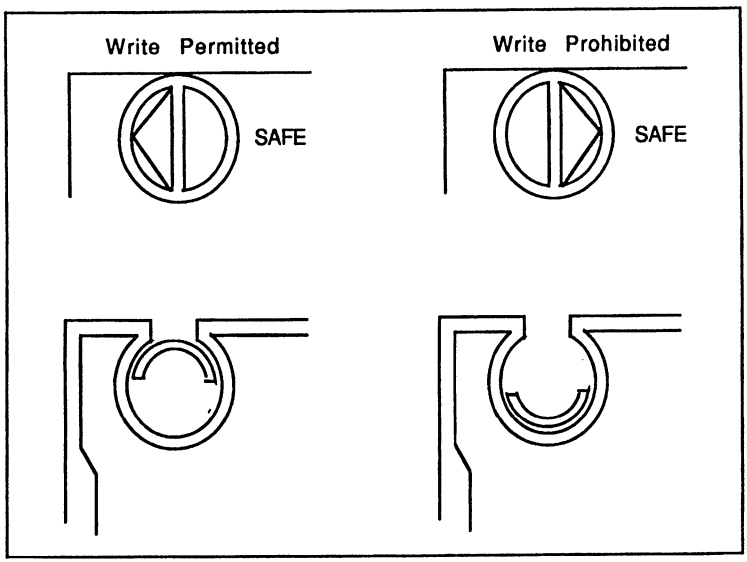
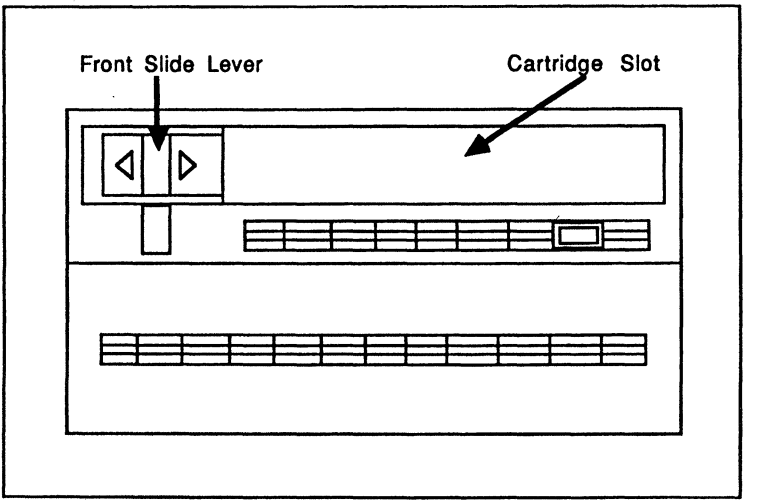


Figure 5–3 **The QIC Tape Drive**



Inserting a QIC Tape

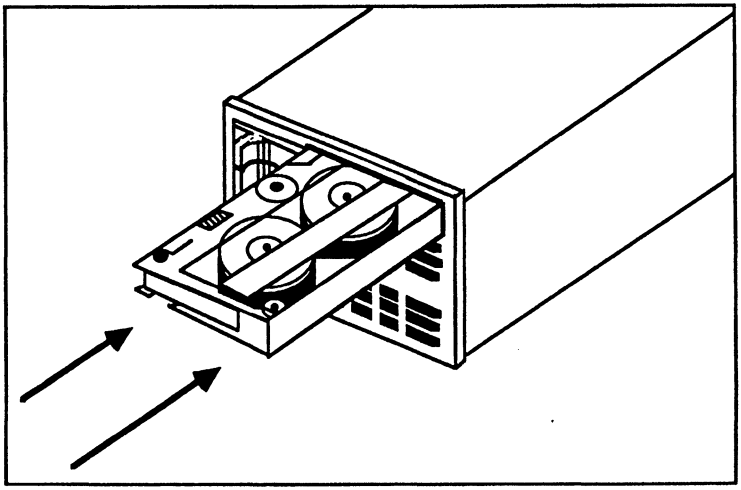
To insert a QIC tape, use the following procedure:

1. Be sure that the XE master base enclosure is powered up.
2. Remove the QIC tape from its case.
3. Insert the QIC tape into the drive, with the cartridge protective door facing left and the base plate of the cartridge facing down (refer to figure 5–4).
4. Push the QIC tape into the drive until it descends into the tape drive.
5. Move the front slide lever to the right until it reaches the lever stop.

   This secures the cartridge and brings the head assembly to its correct operating position.

You have now loaded the QIC tape. Note that the red indicator lights up when the QIC tape drive is being used.

Figure 5–4 **Inserting the QIC Tape**



Removing a QIC Tape

To remove a QIC tape, use the following procedure:

1 Make sure the drive indicator light is off.

2 Move the front slide lever to the left until it reaches the lever stop.

The head assembly in the drive retracts and the protective door on the cartridge closes. A cartridge ejector automatically raises the cartridge out of the drive and slowly pushes it forward.

3 Remove the QIC tape and return it to its case.

Retensioning a QIC Tape

You use the mQIC RETENSION command to rewind a QIC tape; this retensions (packs) the tape.

To retension a QIC tape using the mQIC RETENSION command, complete the following:

1 Insert the QIC tape into the QIC tape drive.
2 Type **mQic Retension** at your workstation's Executive command line.
3 Press **GO**.

Using a Half–Inch Tape

Half–inch tapes also provide you with portable media on which to store initial and future information. You can also use them as backup storage devices.

Handling a Half–Inch Tape

When handling half–inch tapes, be careful not to touch the first few inches of the tape so that you do not lose the identifying information in the first tape file.

If either the tape or the header records are unreadable, the system scans the tape until it finds a valid data block. The TAPE RESTORE command recognizes the tape as a valid backup tape if the data block conforms to the format of a tape backup data block. However, if you attempt to append data to a tape that has unreadable tape or file headers, the tape backup commands return an error.

Caring for the Half–Inch Tape Drive

The tape transport (drive) has two heads, one behind the other, that float very close to the tape media, and read and write to it.

When the drive is writing, the first head writes, while the second head, set at low gain, reads behind it to verify the quality of the writing. When the drive is reading, the read head is set at high gain for more sensitivity.

If the drive is writing and the second head cannot read what the first head has just written, the system reports a write error.

If you are experiencing several errors, you should check to make sure that the drive heads are clean; dirty heads are the most frequent cause of errors. If you are using the drive heavily, you should clean the drive heads every day. Otherwise, weekly cleanings are recommended.

Loading a Half–Inch Tape

To load a half–inch tape, complete the following:

1 Attach a write–enable ring on the back of the tape reel of a 2400–foot, half–inch magnetic tape.
2 Insert the reel into the tape drive and close the door.
3 Press **Load/Rewind** (on a Cipher drive) or **Load/Online** (on a Pertec drive).

   The indicator light flashes while the tape is automatically loaded. The tape is finished loading when the light stops blinking and remains lit.
4 Press **Online** (on a Cipher drive) or **Load/Online** (on a Pertec drive).

From this point, the drive responds to commands from the system rather than from its control panel. If you have trouble loading the tape, refer to your tape drive's documentation.

Removing a Half–Inch Tape

To remove a half–inch tape, complete the following:

1 Press **Online** (on a Cipher drive) or **Load/Online** (on a Pertec drive) to make sure that the tape drive is offline.
2 Press **Unload** twice (on a Cipher drive) or **Rewind** twice (on a Pertec drive).

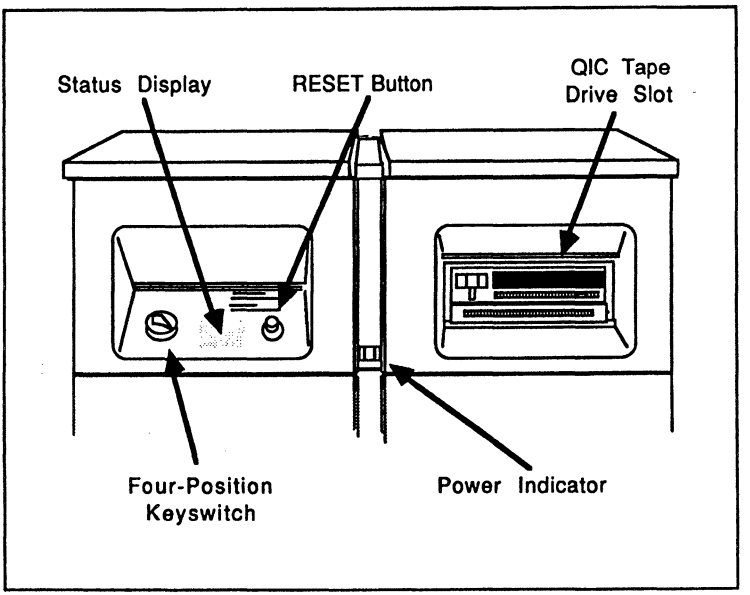
Starting Up the XE Master

The discussion of the start–up procedure assumes that you know how to power up and power down any Unisys BTOS–based workstations that are part of the system. It also assumes that you know how to use floppy disks with the workstation floppy disk drives. If you are unfamiliar with the operation of these workstations, you should read through your Standard Software documentation before proceeding.

XE Master Controls

All the XE master controls, except the **POWER ON/OFF** switch, are part of the base enclosure front panel. The front panel (shown in figure 5–5) is located just above the front door of the base enclosure.

Figure 5–5 **Sample XE Master Base Enclosure Front Panel**



The front panel consists of the following components:

- four–position keyswitch
- STATUS display
- **RESET** button
- power indicator
- QIC tape drive slot (optional)

The keyswitch setting determines the operating mode of the XE master. You use the control panel keys that were packed with the XE master to turn the keyswitch. You select the operating mode by turning the key to the desired position. You lock the keyswitch at a selected position by removing the key.

The keyswitch positions are defined in table 5–1.

Table 5–1 **Keyswitch Positions on the XE Master**

Keyswitch Position	XE Master Operating Mode
STOP	STOP places the system in a reset state and prevents anyone from using it.
MANUAL	MANUAL enables the RESET button and boots the system in manual mode.
REMOTE	REMOTE is used during initial system software installation. Once you have installed the software, you use this keyswitch position to troubleshoot system problems or to disable the RESET button.
NORMAL	NORMAL disables the RESET button and boots the system in NORMAL mode.

Because the MANUAL keyswitch position enables the RESET button, which could be pressed accidentally during system operation, you should generally use the NORMAL keyswitch position. If you have to reset the system for any reason, you can do so by turning the key to STOP and then back to NORMAL.

The STATUS display shows status codes that indicate the operating status of the system. (Refer to your system status codes reference documentation.)

The power indicator lights up when the system is turned on and the internal power supply is operating properly.

You can use removable media (QIC tape or half–inch tape) to load system software. This media provides backup storage for the BTOS file system. If your base enclosure does not have a QIC tape drive slot, the removable medium for your system is half–inch tape. (Refer to Using QIC Tapes and Using Half–Inch Tapes for more information.)

Powering Up the XE Master

Caution: Whenever you power up the XE master, make sure that the removable medium drive is empty and the keyswitch is set to STOP.

To power up the XE master, complete the following:

1 Locate the **POWER ON/OFF** switch (refer to figure 5–6) at the rear of each enclosure in the system and turn each switch to the ON position.

When powering up enclosures in a multi–enclosure system, start with the base enclosure, then power up the second enclosure, the third enclosure, and so on.

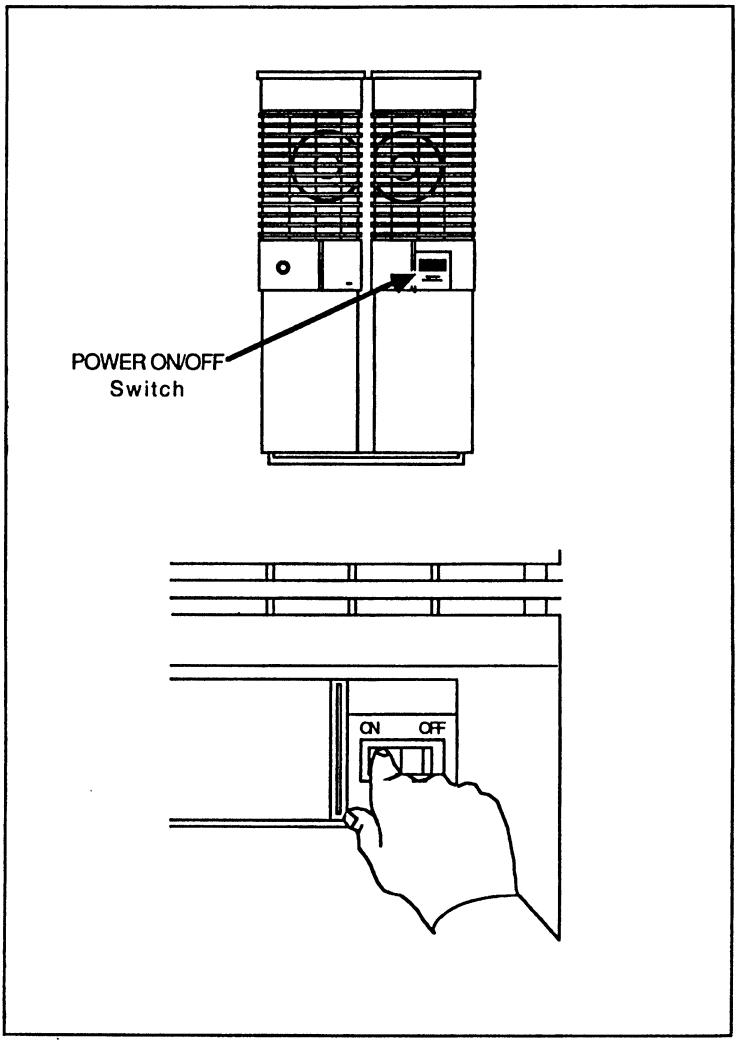
If you have powered up correctly, the power indicator at the front panel of each enclosure should be lit, the STATUS display at the base enclosure should show the value 00, and you should hear the fans and feel a steady flow of air from the rear ventilation grill of each enclosure.

If any of these three conditions do not occur after powering up the XE master, turn the XE master off and contact your Unisys field engineering representative.

2 Once the enclosures are powered up, turn the keyswitch from STOP to MANUAL, REMOTE, OR NORMAL, depending on the operating mode you want the system to run in.

(Refer to the *XE500 BTOS Administration Guide* for more information on operating modes.)

Figure 5–6 **XE Master Enclosure POWER ON/OFF Switch**



Powering Down the XE Master

To power down the XE master, use the following procedure:

1. Make sure that all users are logged off, and that workstations and peripheral devices (for example, printers and tape drives) are turned off.
2. Make sure that no tape is currently mounted.
3. Turn the keyswitch on the base enclosure to STOP.
4. Power down each enclosure in the system, starting with the enclosure farthest from the base enclosure.

   The power indicator(s) should go off, the STATUS display should disappear, and the fans should stop operating.

Updating versus Initializing

Before you load new software, you need to decide whether you want to initialize or update your system. Initializing your system erases the existing data and files on the volume, and allows you to start from a known point. Updating your system allows you to save customized system configuration files; however, when you update your system, old and incompatible files that you do not delete may corrupt your system or unnecessarily use disk space. In addition, customized BTOS processor operating systems are overwritten while updating.

Note: Although it is not required, it is highly recommended that you initialize your system before you install the XE operating system, version 7.1.

If you choose to update your system rather than reinitialize it, you should be aware that your system can contain files that are incompatible with the XEBTOS 7.1 software.

When updating your system, you can save the following types of system configuration files:

- processor initialization files
- processor configuration files
- device configuration files (that is, files created through the mCREATE CONFIGURATION FILE utility)

- the queue index file, [sys]<sys>queue.index
- the printer spooler configuration files–for example, [sys]<sys>splcnfg.sys

Changes are required for some processor configuration and initialization files (refer to section 6).

Initializing Your XE Master Hard Disk

This subsection explains how to install the XE master operating system onto your system, and includes procedures for initializing your system disk.

The software covered in this section is available on QIC or half-inch tape. The installation procedure is nearly the same for each medium. Both media come with a floppy diskette that you insert into your workstation's floppy drive to start the installation procedures.

Hardware Requirements

Before installing XE master BTOS operating system, verify the following hardware requirements:

- The RS–422 cable must be attached to the XE master on channel 1a, 1b, 2a, or 2b on the CP board. The RS–422 cable must also be attached to the BTOS workstation in one of the cluster communication slots.
- The RS–232 cable (crossed pins) must be attached to the XE520 on channel 3 of the CP00, and to the BTOS workstation in the RS–232 Channel B slot. If you don't have the RS–232 cable, use compatible a serial printer cable.

Installing the XE Master Software

To install the XE master system software, use the following procedure:

1. Insert the appropriate floppy disk for your workstation into the disk drive.
2. Power up or reset the workstation.

   The workstation boots from the floppy disk and then displays the Signon screen.

3 At the Signon screen, press **GO**.

4 Verify that the XE master is powered up and that the key on the front status panel is in the STOP position.

5 Depending on the medium you use, load either the QIC tape or the half-inch tape.

6 Turn the front panel key on the XE master to the REMOTE position.

The XE master now boots up from the tape. This takes approximately five minutes.

When it finishes, the system displays a menu containing the following options:

0 = Set Path
1 = Set Time
2 = Initialize a Volume
3 = Restore Volume from Tape
4 = Change Volume Name
5 = Backup a Volume to Tape

7 Type **2**.

8 Press **RETURN**.

The system displays the mIVOLUME command form parameters as a series of prompts asking you to supply information.

Refer to figure 5-7 for the recommended responses to these mIVOLUME prompts if your XE master is an XE520-4 system. Refer to figure 5-8 for the recommended responses to these mIVOLUME prompts if your XE master is an XE520-5 or XE520-6 system.

Caution: Do not assign a volume password to your system disk. Use CHANGE VOLUME NAME (option 1), after you use RESTORE VOLUME FROM TAPE (option 3), to password-protect your system disk. Failure to do this will cause poor performance and the inability to load system services on the XE until the <spl> and <$000> directories are removed and recreated without a password.

Figure 5–7 **Recommended mIVOLUME Responses for XE520–4 Systems**

Device Name: :	**d 1**
Device Password: :	**d 1**
Volume Name: :	(Enter a volume name)
Volume Password: :	
System Image sectors: [512] :	
Log file sectors: [32] :	
Crash file size in sectors: [1536] :	
Maximum number of directories on volume: [0] :	**3 0 0**
Maximum number of files on volume: [0] :	**4 0 0 0**
Primary file headers only? [No] :	
Maximum number of files in Sys directory: [0] :	**4 0 0**
Sys directory password: :	
Write protect Sys directory? [No] :	
Suppress format of medium? [No] :	
Surface tests: [9] :	(Minimum of) **3**
Debug? [No] :	
Bad spots: :	
Bad spots: :	
Bad spots: :	

Figure 5–8 **Recommended mIVOLUME Responses for XE520–5 and –6 Systems**

Device Name: :	**s 0**
Device Password: :	**s 0**
Volume Name: :	(Enter a volume name)
Volume Password: :	
System Image sectors: [512] :	
Log file sectors: [32] :	
Crash file size in sectors: [1536] :	
Maximum number of directories on volume: [0] :	**6 0 0**
Maximum number of files on volume: [0] :	**8 0 0 0**
Primary file headers only? [No] :	
Maximum number of files in Sys directory: [0] :	**8 0 0**
Sys directory password: :	
Write protect Sys directory? [No] :	
Suppress format of medium? [No] :	
Surface tests: [9] :	(Minimum of) **3**
Debug? [No] :	
Bad spots: :	
Bad spots: :	
Bad spots: :	

9 Respond to each prompt, pressing **RETURN** after each response.

Note: If you need to change a response after you have pressed **RETURN**, continue to respond to the remaining prompts, pressing **RETURN** after each. After responding to the final prompt, continue to press **RETURN** to cycle through the prompts until you reach the one you want to change.

10 Press **GO**.

If your disk is unformatted or corrupted, the system prompts you with the following message:

*******NO Valid Initial Home Block.**
Please enter the device type of the disk:

If you see this prompt, refer to Formatting a New or Corrupted Disk in this section

If your disk is a valid volume (formatted and not corrupted), the system displays the following message:

Do you wish to ERASE this volume?
(Press Y to confirm, N to deny, or Q to quit the utility)

11 Press **Y**.

The system begins formatting the disk. This can take 15 minutes or more, depending on the size of the disk and the number of surface tests you specified. When it finishes, the system displays the prompt:

Please insert system tape, then hit <CR> key to reload menu program.

12 Press **RETURN**.

The menu returns to the screen.

13 Press **0**.

14 Press **RETURN**.

The system prompts you for the name you assign to your volume.

15 Enter your volume name.

16 Press **RETURN**.

The system prompts you for a directory name.

17 Enter **Sys**.

18 Press **Go**.

The menu returns to the screen.

19 Press **3**. (Restore Volume from Tape)

20 Press **RETURN**.

The system displays a series of prompts asking you to supply information.

21 Enter the following in response to the system prompts, pressing **RETURN** after each prompt:

Archive file:	**[QIC]8** or **[Tape]8**
File list from:	<*>*
To file list:	<*>*
Overwrite ok [Prompt]:	**Yes**
Confirm each [No]:	
Sequence number [1]:	
Merge with existing file [No]:	
List file only [No]:	
Log file:	
Boot Tape [No]:	**No** (Qic tape) or **Yes** (half-inch tape)

If you are installing the software from QIC tape, proceed to step 25.

22 Press **GO**.

The system displays the following prompt:

Configuration file cannot be found. Please enter following information:

<GO>/<ESC> to exit interaction, <CR> to continue.
Record size [10240]:

23 Press **RETURN**.

The system displays the following prompt:

Rewind on completion [yes]:

24 Press **RETURN**.

The system displays the following prompt:

High speed tape [yes]:

25 Press **GO**.

The system restores the files. This procedure takes approximately ten minutes. When it finishes, the system displays the following prompt:

Please insert system tape, then hit <CR> key to reload menu program.

26 Remove the tape from the drive.

27 Turn the key on the front panel of the XE master to STOP then to REMOTE.

The XE master boots from its own disk.

28 Remove the floppy from your workstation drive.

This completes the initial software installation. You are now ready to install workstation software, explained in Section 2, and to configure your system, explained in Section 6.

Formatting a New or Corrupted Disk

When the XE master boots up from the tape at the beginning of the software installation procedures, the system displays a menu containing the following options:

0 = Set Path
1 = Set Time
2 = Initialize a New Volume
3 = Restore Volume from Tape
4 = Change Volume Name
5 = Backup a Volume to Tape

If you choose option 2, complete the mIVOLUME Command Form and press **GO,** the system prompts you with the following message if your disk is unformatted or corrupted:

*****NO Valid Initial Home Block.**
Please enter the device type of the disk:

In response to this prompt, complete the following:

1 Type **new**.

2 Press **RETURN**.

The system displays the following series of prompts:

Removable Media?:
Cylinders Per Disk:
Tracks Per Cylinder:
Sectors Per Track:
Step Rate Code:

3 Respond to each prompt according to the type of drive on your system. To determine your drive type, check the sheet that lists bad spots, or call your Customer Service representative.

Refer to table 5–2 and table 5–3 for a list of the drive types and the appropriate prompt responses for each.

4 Press **RETURN** after completing the information for each prompt.

5 After responding to the final prompt, press **GO**.

The system begins formatting the disk. This can take 15 minutes or more, depending on the size of the disk and the number of surface tests you specified. When it finishes, the system displays the prompt:

Please insert system tape, then hit <CR> key to reload menu program.

6 Continue with step 12 in the subsection, Installing the XE Master Software.

Table 5–2 **XE Master Drive Types and Menu Responses Unisys Supports**

Drive Type	Menu Responses
Atasi 46 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **645** Tracks Per Cylinder: **7** Sectors Per Track: **16** Step Rate Code: **0**
Hitachi 51 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **699** Tracks Per Cylinder: **7** Sectors Per Track: **16** Step Rate Code: **0**
Hitachi 85 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **823** Tracks Per Cylinder: **10** Sectors Per Track: **16** Step Rate Code: **0**
Memorex 166 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **823** Tracks Per Cylinder: **10** Sectors Per Track: **32** Step Rate Code:
Micropolis 52 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **753** Tracks Per Cylinder: **6** Sectors Per Track: **16** Step Rate Code: **0**

Table 5–2 **XE Master Drive Types and Menu Responses Unisys Supports** (continued)

Drive Type	Menu Responses
Micropolis 85 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **1024** Tracks Per Cylinder: **8** Sectors Per Track: **17** Step Rate Code: **0**
Toshiba 85 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **830** Tracks Per Cylinder: **10** Sectors Per Track: **17** Step Rate Code: **0**

Table 5–3 **XE Master Drive Types and Menu Responses Unisys Does Not Support**

Drive Type	Menu Responses
Ball 100 Mb Drive	Removable Media?: **Yes** Cylinders Per Disk: **1024** Tracks Per Cylinder: **5** Sectors Per Track: **32** Step Rate Code:
CDC 300 Mb Drive	Removable Media?: **Yes** Cylinders Per Disk: **823** Tracks Per Cylinder: **19** Sectors Per Track: **32** Step Rate Code:
CDC 340 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **711** Tracks Per Cylinder: **24** Sectors Per Track: **32** Step Rate Code:
CDC 675 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **840** Tracks Per Cylinder: **40** Sectors Per Track: **32** Step Rate Code:

Table 5–3 **XE Master Drive Types and Menu Responses Unisys Does Not Support** (continued)

Drive Type	Menu Responses
Fujitsu 80 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **589** Tracks Per Cylinder: **7** Sectors Per Track: **32** Step Rate Code:
Maxtor 53 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **903** Tracks Per Cylinder: **5** Sectors Per Track: **16** Step Rate Code: **0**
Maxtor 143 Mb Drive	Removable Media?: **No** Cylinders Per Disk: **918** Tracks Per Cylinder: **15** Sectors Per Track: **16** Step Rate Code: **0**
Unknown Drive	Removable Media?: **No** Cylinders Per Disk: **300** Tracks Per Cylinder: **7** Sectors Per Track: **16** Step Rate Code: **0**

Installing Standard Workstation Software on the XE Master

To install BTOS workstation software onto the XE master disk, you use system utilities that you run from your workstation.

The standard workstation software allows you to boot the workstation from the XE master and to install the BTOS workstation utilities.

Refer to section 1 for information on each BTOS II package and the number of disks in each package.

Note: Before the XE master can support workstations, you must install the following required packages: BXXST1 (XX is your workstation type), B25SU1, and B25CL1. Although the other packages are optional, some BTOS environmental software can require software contained in them.

Section 2 provides step-by-step instructions to install the workstation software. Read section 2 before you begin installation to get an overview of the installation process.

After reading section 2, verify that:

- ☐ the XE master is powered up (refer to Powering Up the XE Master)
- ☐ your workstation has a floppy disk drive
- ☐ your workstation is connected to CP00 of the XE master

To install workstation software, you follow the procedures in section 2 in Installing the Standalone Software Package, making the following change:

- ☐ In step 2, type **XE520** in the **User name** field.

You should install these packages also according to the instructions in section 2:

- ☐ Standalone Utility Package
- ☐ Cluster Software Package
- ☐ Language Development Package

Configuring Your XE Master

XEBTOS uses several text files to define the system's hardware and software configurations. The system reads these text files when you load BTOS into the XE master processor boards (that is, when you boot the system). This section describes various files needed for configuration, then describes how to use these files.

Note: The system reads different sets of configuration files depending on the positions to which the keyswitch can be turned to boot the system. Refer to "Running the System in Different Operating Modes" in your *XE500 BTOS Administration Guide* for details.

Configuration Files Overview

To configure your XE master, you use these files:

- the Master configuration file
- processor configuration files
- processor initialization files
- I/O device configuration files

You use the mBTOS CONFIG utility to create or alter the Master configuration file, the processor configuration files, and the processor initialization files. You use the mCREATE CONFIGURATION FILE utility to create or alter I/O device configuration files.

The Master Configuration File

The master processor (FP00 or DP00) uses the master configuration file to determine the processor operating systems to be loaded at boot time. It contains an entry for each processor in the system, except the master processor. The entries define the version of XEBTOS it loads on the processors. Other entries in this file define the processor configuration files for applicable processors.

At boot time, the master processor (FP00 or DP00) loads its own operating system, [sys]<sys>SysImage.sys. (The operating system is also referred to as a system image.) It then reads the default master configuration file, [sys]<sys>Master.cnf, to determine the versions of BTOS for the other processor boards and the order in which to load them.

When you boot the system in **REMOTE** mode, the system uses the master configuration file, [sys]<sys>Master.r.cnf. This master configuration file allows enough of the system to be brought up so that you can run the mBTOS CONFIG utility.

You use the mBTOS CONFIG utility to create or alter the Master configuration file. By using the utility, you can:

- create the master configuration file if one does not already exist
- list the contents of the existing master configuration file
- add processor board entries to the master configuration file
- delete processor board entries from the master configuration file

The Master configuration file contains the following line entries:

- the WatchDog=None entry

  The line **WatchDog=None** must be included in the master configuration file. (The line **nowatchdog** can be used for backward compatability.)
- the nowatchdog entry

- processor BTOS entries

  BTOS entries following the nowatchdog entry for each processor in the XE master, except the master processor. Each of these entries determines the version of BTOS to be run on the processor. Entries are ordered according to how their corresponding processors are configured in the XE master enclosures. The first entry corresponds to the first processor board after the master processor, the next entry corresponds to the next processor board, and so on.

- include statement entries for processor configuration files

  The master configuration file can contain an include entry for the processor's configuration files (if required). If a processor needs an include entry, that entry must immediately follow the processor's BTOS entry.

  A CP or TP configuration file defines the I/O ports the processor supports and the X, Y, and Z block allocations. An FP or DP configuration file defines the Y and Z block allocations and the internal disk devices associated with the processor. An SP configuration file defines the Y and Z block allocations for the SP.

Caution: You should not include the master processor and SP configuration files in the master configuration file. The system automatically assumes the master processor configuration file to be [sys]<sys>Fp00.cnf or [sys]<sys>Dp00.cnf, and all SP configuration files to be [sys]<sys>Spnn.cnf, where nn is the SP number.

By convention, processor configuration file names always have the suffix ".cnf."

Sample Master Configuration File

The following is a sample master configuration file:

```
WatchDog=None
Cp          [sys]<sys>CpBtos.sys
Include     [sys]<sys>Cp00.cnf
Tp          [sys]<sys>TpBtos.sys
Include     [sys]<sys>Tp00.cnf
Sp          [sys]<sys>SpBtos.sys
Cp          [sys]<sys>CpBtos.sys
Include     [sys]<sys>Cp01.cnf
```

This master configuration file is for a system that contains, in ascending order by slot number, a master FP, a CP, a TP, a DP, an SP, a second FP, and a second CP.

The BTOS version entries comprise the processor name in the first column and the processor's BTOS version file in the second column. The master processor, and all processors of the same type as the master, run the master version of BTOS, [sys]<sys>SysImage.sys. BTOS versions for all other processors take the form [sys]<sys>ZpBtos.sys, where Zp represents the processor type (CP, TP, SP, FP, or DP).

Note that each BTOS version entry is followed by an include entry for that processor's configuration file (except for the SP, as discussed in previous cautionary note). The include entries are denoted by the word "Include" in the first column, followed by the processor's configuration file. Processor configuration files take the form [sys]<sys>Zpnn.cnf, where Zp represents the processor type and nn is the processor's number within the system. This number uniquely identifies processor boards of the same type.

Note: The master configuration file must contain tab characters (not spaces) between the first and second column entries.

Processor Configuration Files

A processor configuration file defines the protocols and/or hardware configuration of a processor's I/O ports. It also includes the X, Y, and Z block allocations for the processor.

In addition to defining X, Y, and Z block allocations, processor configuration files for FPs and DPs define the disk drives that they support. For CPs and TPs, they define the terminal ports that they support. By convention, processor configuration files always have the suffix .cnf.

You use the mBTOS CONFIG utility to create or modify processor configuration files. With this utility, you can:

- create default processor configuration files
- list the contents of a processor configuration file
- add or modify entries in a configuration file
- delete entries from a configuration file
- add or modify X, Y, or Z block allocation entries in a processor configuration file

Processor configuration file names take the form [sys]<sys>Zpnn.cnf, where Zp is the processor type (such as FP, CP) and nn is the processor number (such as 00, 01, or 02). For example, the first CP is CP00, the second CP is CP01, the third CP is CP02, and so on.

Dynamic Block Allocation

The system uses X, Y, and Z blocks to provide buffer space for various types of communications.

The system uses X blocks exclusively in the CP for data transmission to and from the workstations. The number of X blocks affects both the ability of the workstations to boot and workstation performance after booting. The default size of an X block is 2560 bytes.

Y blocks are the large IPC (Inter-Processor Communications) communication blocks. They generally handle responses from a server process to a client process. The default size of an Y block is 2560 bytes.

Z blocks are the small IPC communications buffers, and the system uses them for the same purpose as Y blocks. The default size of a Z block is 100 bytes.

Note: The default values provided for the dynamic block allocations allow adequate performance for most configurations.

You allocate X, Y, and Z blocks by adding a line (or lines) in the processor configuration file. These line entries have the following form:

Blocktype=type, Number=nn [, Size=ss]

Blocktype must begin in column 1.

type is X to allocate X blocks, Y to allocate Y blocks, and Z to allocate Z blocks.

nn is the number of blocks to allocate.

ss is the size of the blocks to be allocated. This parameter is optional. If it is not specified, the default size is used.

Note: If you add line entries, Y blocks must be the same size on every board, Z blocks must be the same size on every board, and the size of Y blocks must be greater than or equal to the size of X blocks . The number of blocks may vary across the processor boards for X,Y, and Z blocks.

For Y and Z blocks, if the number of blocks multiplied by the size of the blocks to be allocated is larger than the space configured for a particular block type when the processor's operating system was generated, new space is dynamically allocated.

This new space is used instead of the space allocated by the operating system; otherwise, the space configured when the processor's operating system was generated is used. Default operating systems are generated when the software release is being packaged. You can modify the parameters used by a BTOS operating system by customizing the operating system.

For X blocks, if the configuration file contains values for the number of X blocks or the size of the X blocks, then the system uses those values to allocate space. Otherwise, the space configured when the CP's operating system was generated is used.

File and Disk Processor Configuration Files

An FP or DP configuration file defines the processor's dynamic block allocation and lists the internal disk devices connected to it. The FP or DP reads this file after its operating system has been loaded and it has booted up.

Two entries in this configuration file define the number of Y and Z blocks to be allocated. Each disk drive connected to the processor uses one of these two entries, which define the device names and passwords assigned to the disk drives.

The following lines represent the entries of a default DP00 configuration file:

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK 0, DEVICE=s0, PASSWORD=s0
DISK 1, DEVICE=s1, PASSWORD=s1
DISK 2, DEVICE=s2, PASSWORD=s2
DISK 3, DEVICE=s3, PASSWORD=s3
DISK 4, DEVICE=s4, PASSWORD=s4
DISK 5, DEVICE=s5, PASSWORD=s5
DEBUGGER
```

The first two lines define the number of Y and Z blocks allocated (23 and 95, respectively).

The next six define disk drive parameters. This DP supports six SMD disk drives. The first column of a disk drive entry lists the disk drive location. The next two columns define the drive's device name and password. In this sample, the device names and device passwords for SMD disk drives 0 through 5 are s0 through s5, respectively.

The following lines represent the entries of a default FP00 configuration file:

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK 0, DEVICE=d0, PASSWORD=d0
DISK 1, DEVICE=d1, PASSWORD=d1
DISK 2, DEVICE=d2, PASSWORD=d2
DISK 3, DEVICE=d3, PASSWORD=d3
DEBUGGER
```

The first two lines define the number of Y and Z blocks allocated (23 and 95, respectively).

The next four define disk drive parameters. This FP supports four built–in disk drives. The first column of a disk drive entry lists the drive's location. The next two columns define the drive's device name and password.

Disk Device Configuration Used by the System

The system's disk configuration definition is determined by both of the following:

- the parameters used when the FP or DP operating system was generated
- the contents of the processor configuration file

When BTOS generates an FP or DP operating system, it creates Device Control Blocks (DCBs) for the number of disks defined by "nWinch," which is one of the parameter entries used during system generation. This entry defines the disk number, device name, and device password for each disk controlled by the FP or DP.

You can modify disk information as defined in the processor's operating system with the information for that disk's entry in the FP's or DP's configuration file. However, if you delete the disk's entry in the configuration file, the system uses the information in the processor's operating system.

The disk parameters in the standard FP and DP operating systems match those defined in the standard FP00 and DP00 configuration files. However, to insure unique device names, the configuration files for all FPs and DPs other than FP00 and DP00 include entries that redefine the device information. For this reason, you should not delete configuration file disk entries for FP01 and up, and DP01 and up.

For example, while the standard operating system executing FP01 defines its disk device names to be d0 through d3, the FP01 configuration file redefines them to be d4 through d7. If you deleted the entry for d4 from this file, the system uses the default information for d0. This would cause a duplicate device name, and the system would return Erc 236 (**Invalid device specification**) when the system attempted to access disk d4.

Cluster and Terminal Processor Configuration Files

The CP and TP configuration files (for example, [sys]<sys>Cp00.cnf for CP00) are used to assign the operating parameters for the CP's and TP's RS–232–C ports and the baud rates for the CP's two RS–422 ports. Serial printers, terminals, and modems connect to RS–232–C ports. Workstation cluster lines connect to CP RS–422 ports.

A CP or TP configuration file must contain an entry for each port to be used.

The CP and TP configuration files are also used to define the dynamic block allocation for the processors.

Note: A CP configuration file must contain at least one async entry for the CP to boot.

RS–232–C Port Line Entries

Entries for the RS–232–C ports take the following form (square brackets are used to indicate optional parameters):

[async] ChannelNumber, [Parity=n], [Speed=n], [StopBits=n], [CharBits=n], [FlowGen], [FlowAct], [FlowAny], [XOFFlev=n], [XONLev=n], [modem], [connect=ctos]

async determines that the port run in async mode. If async is not included in port entries for CP channels 1 through 2 and TP channels 1 through 4, these ports will run in sync mode. CP channel 3 and TP channels 5 through 10 are async only ports and so "async" is always included in their port entries.

ChannelNumber is the processor channel number corresponding to the RS–232–C port, CP channels 1 through 3 and TP channels 1 through 10.

Parity=n is the parity setting for data transmitted through the port. Valid values for n are "none," "even," or "odd."

If this parameter is not included, the default parity is none.

Speed=n is the baud rate for the port. Valid values for n are: 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, or 9600. Sync/async channels can also run at 19200.

StopBits=n is the number of stop bits for data transmitted through the port. StopBits=1 and StopBits=2 set the number of stop bits to 1 and 2, respectively. StopBits=0 sets the number of stop bits to 1.5.

CharBits=n is the number of character bits per data character being sent through the port. Valid values for n are: 5, 6, 7, or 8.

You cannot use values less than 7 in conjunction with the flow control parameters.

FlowGen, if included, specifies that the processor should issue XON and XOFF characters, as appropriate, during data transmission. If this parameter is not included, XON and XOFF characters are not issued.

FlowAct, if included, specifies that the processor should honor incoming XON and XOFF characters during data transmission. If this parameter is not included, XON and XOFF characters are not honored.

FlowAny, if included, specifies that, after receiving an XOFF, the processor should honor the next character received during data transmission as an XON. If this parameter is not included, XON and XOFF characters are honored according to the status of the FlowGen and FlowAct parameters.

XOFFlev=n specifies that if the number of free slots in the character input FIFO (first in, first out buffer) falls below n, an XOFF should be sent. This parameter is only valid if the FlowGen parameter has been specified.

XONLev=n specifies that if the number of free slots in the character input FIFO increases to n and an XOFF was previously sent, an XON should be sent. This parameter is only valid if the FlowGen parameter has been specified.

modem specifies that the XE master not transmit on the line until the appropriate modem signals are detected.

[connect=ctos] specifies that the port is to be used as the CLI port. An RS-232-C serial terminal can be connected to this port. The CLI can then be run interactively from this terminal.

Only one RS–232–C port per CP or TP can be configured as the CLI port. For a CP, it must be channel 3. For a TP, it must be channel 10.

Note: The line characteristics for an RS–232–C line supporting a printer are not defined by the entry in the processor configuration file. The characteristics defined in the printer's configuration file are used instead.

RS–422 Cluster Port Line Entries

Entries for the CP RS–422 cluster ports take the following form (square brackets are used here to indicate an optional parameter):

LINE LineNumber [, Clock=n]

LineNumber is the number of the RS–422 port. Valid numbers are 1 (for cluster lines 1A and 1B), and 2 (for cluster lines 2A and 2B).

Clock=n specifies the baud rate for the port. Valid values for n are 307 k (for a baud rate of 307 k) or 2M (for a baud rate of 1.8 M). If this parameter is not included, the default value of 307 k is used.

Default Cluster Processor Configuration File

The following lines represent the entries of a default CP configuration file:

```
BlockType=x, Number=16
BlockType=y, Number=6
BlockType=z, Number=60
async 3, speed=9600, parity=none, stopbits=1,
charbits=8, connect=ctos
line 1, clock=2M
line 2, clock=2M
DEBUGGER
```

This CP is supporting one serial printer, connected to channel 3, and two workstation cluster lines. The workstation cluster lines are set to run at a baud rate of 2M.

Storage Processor Configuration File

The SP configuration file contains dynamic block allocation entries for Y and Z blocks. The following is a default SP configuration file:

BlockType=y, Number=4
BlockType=x, Number=30

The number of Y and Z blocks allocated are 4 and 30, respectively. Note that each SP must have a configuration file for the SP to boot properly, even if the file does not contain any line entries.

Processor Initialization Files

Each processor normally has an initialization file. Processor initialization file names take the form [sys]<sys>initZpnn.jcl, where Zpnn is the processor designation (for example, FP00, CP02).

The initialization file is a text file that contains a line entry for each system service to be run on the processor. Each line entry in an initialization file is a run statement that loads and activates the system service's run file on the processor.

You use the mBTOS CONFIG utility to create or modify processor initialization files. With this utility, you can:

- create default processor initialization files
- list the contents of a processor initialization file
- add system services to a processor initialization file
- delete system services from a processor initialization file

For more information, refer to Creating or Modifying Processor Initialization Files.

I/O Device Configuration Files

XE master disk drives, system printers, half-inch magnetic tape drives, and data communication (data comm) equipment (for example, modems) require configuration files to define their hardware and software operating parameters.

You use the mBTOS CONFIG utility to create or modify I/O device configuration files. With this utility, you can:

- define operating parameters for system printers
- define operating parameters for tape drives
- define operating parameters for data communication equipment

Disk Drive Configuration Files

The necessary disk drive configuration files are included in the standard software release. Disk drive configuration file names take the following form:

[sys]<sys>drivename.cnf

drivename is the name that specifies the drive type for the system. These files do not normally require modification. The disk drive configuration files that come with standard software are listed in appendix D.

Printer Configuration Files

Default configuration files for a parallel printer and a serial printer are included in the standard software release. The parallel printer device configuration file name is:

[sys]<sys>SplConfigCp00.sys

The serial printer device configuration file name is:

[sys]<sys>SplCConfigCp00.sys

You reference the system's printer device configuration files in the printer spooler configuration file, [sys]<sys>SplCnfg.sys. Because you can modify the printer spooler configuration file, printer configuration files can have any file name. Also, you can use the same printer device configuration file for more than one printer.

For serial printers, the line characteristics defined in the printer's device configuration file override those defined in that line's port entry found in the processor configuration file.

Half–Inch Tape Drive Configuration Files

A default configuration file for a half–inch tape drive is included in the standard software release. The default half–inch tape drive configuration file name is:

[sys]<sys>TapeConfig.sys

You can modify or create half–inch tape drive configuration files by using the mCREATE CONFIGURATION FILE utility (refer to Using the mCREATE CONFIGURATION FILE Utility in this section).

Communication Device Configuration Files

You must create configuration files for communication devices, such as modems or terminals, using the mCREATE CONFIGURATION FILE utility (refer to Using the mCREATE CONFIGURATION FILE Utility in this section). Refer to the device's supporting documentation to determine parameter values for which the mCREATE CONFIGURATION FILE utility prompts you.

Creating Configuration Files

You use the mBTOS CONFIG utility to create or modify:

- the Master configuration file
- processor configuration files
- processor initialization files

You use the mCREATE CONFIGURATION FILE utility to create or modify:

- I/O device configuration files

The following subsections describe how to use the mBTOS CONFIG utility to modify or create configuration files and how to use the mCREATE CONFIGURATION utility to modify or create I/O device initialization files.

Using the mBTOS CONFIG Utility

You use the mBTOS CONFIG utility to:

- create the system configuration files if you are installing XE master BTOS software for the first time
- modify current files or create new files to reflect changes in your system configuration if you have already installed and configured system software

Note: If you have initialized the system disk and have just completed installing system software, do not reboot the system. Leave the system in the restricted mode until you have created the system configuration files with the mBTOS CONFIG utility.

Invoking the mBTOS CONFIG Utility

To invoke the mBTOS CONFIG utility, you type **mBTOS Config** at the BTOS Executive command line and press **GO**.

Each mBTOS CONFIG menu comprises the following:

- a heading that describes the purpose of the menu
- a list of actions to select from; each action is assigned a number that BTOS uses to enter your selection
- a prompt at which you enter the number of the action you want to execute

After entering the desired number, you must press **RETURN** or **GO** to execute the action.

When you invoke the mBTOS CONFIG utility, the system displays a welcome message, along with a listing of the standard master configuration file ([sys]<sys>Master.cnf).

If the master configuration file does not exist, the system creates it dynamically when you invoke the mBTOS CONFIG utility. The utility polls the actual processor boards installed in the system to find out which processors exist. It then builds the master configuration file entries, using the standard processor BTOS versions and processor configuration file names.

If the master configuration file already exists, the system displays its contents when you invoke the mBTOS CONFIG utility.

After displaying the listing of the master configuration file, the system displays the main Default Menu. This Default Menu gives you the option to:

- exit the utility and return to the BTOS Executive
- automatically create default configuration and initialization files for each processor listed in the master configuration file
- modify the master configuration file
- selectively create or modify the processor initialization and configuration files

Creating Default Versions of Initialization and Configuration Files

For each processor in the system, you need an initialization file, with a suffix of .jcl, and a configuration file, with a suffix of .cnf. These files should be in the [Sys]<Sys> directory on your disk.

If you initialized the system disk as part of the software installation procedure, the initialization and configuration files required to operate the system in NORMAL mode do not exist. Only the files that allow the system to be operated in REMOTE mode exist on your disk, and these files have a suffix of .r.jcl and .r.cnf. You run the mBTOS CONFIG utility to create the normal versions of these files.

The utility allows you to automatically create default versions of all necessary system initialization and configuration files. It is recommended that you create the default version of these files first, then run the utility again to modify the files that you created, if necessary.

You can also choose to selectively create non-default versions of system initialization and configuration files. If you do this, make sure that you create an initialization file and a configuration file for each processor in the system.

To create the default versions of BTOS system initialization or configuration files, use the following procedure:

1 Type **mBTOS Config** at the BTOS Executive command line.

2 Press **GO**.

The mBTOS CONFIG utility begins running. The system creates the normal mode master configuration file and displays its contents. The system displays the Default Menu and prompt following the master configuration file listing.

3 At the Default Menu prompt, type **2**.

4 Press **RETURN**.

The utility creates default normal mode configuration and initialization files for each processor listed in the master configuration file.

After the processor configuration and initialization files are created, the system displays the message **mBTOS Config Utility Complete** and displays the BTOS Executive command line.

5 Using the TYPE command or the Editor, review all processor initialization files to make sure that they match the actual system configuration.

If you need to modify any files to match the system configuration, run the mBTOS CONFIG utility again, selecting the **Do Not Use Default** option of the mBTOS CONFIG Default Menu.

If the BTOS system configuration files do not need modification, or when you have finished modifying them, proceed to Rebooting the System after Running mBTOS CONFIG in this section.

mBTOS CONFIG –Old Files

The mBTOS CONFIG utility does not keep a log file of each session. However, for any configuration files you modify, BTOS saves the original file and appends the –old to the file name. This allows you to keep the previous version of the file. You may need the old version of the file if the modified version causes system problems, or is lost or corrupted.

Note: Only the previous generation of a configuration file is saved as an old file.

For example, assume that you had modified the original CP00 configuration file. If you modify this file again, BTOS overwrites the original file, now appended with –old, with the first modified version of the file.

Rebooting the System After Running mBTOS CONFIG

To implement any modifications made to system configuration files, you must reboot the system by turning the keyswitch to STOP and then to NORMAL. If you do not reboot the system, the system continues to run based on the system configuration files that existed at the time of the last booting.

If you have just created your system configuration files as part of the software installation procedure, you must reboot the system.

Modifying the Master Configuration File

You can perform three operations on the Master Configuration file:

- modify the Master Configuration file
- add processor entries
- delete processor entries

To modify the file, you invoke the mBTOS CONFIG utility. You type **MBTOS CONFIG** at the Executive. The system displays the main Default Menu and prompt as shown in figure 6–1.

Figure 6–1 **Default Menu**

```
0 = EXIT UTILITY
1 = DO NOT USE DEFAULT
2 = USE DEFAULT SYSTEM FILES

Please Select Mode of Operation ==>
```

To modify the master configuration file, select option 1 and press **RETURN**. The system displays the Main Menu, from which you can select the type of file you want to create or modify.

The system displays the Main Menu and prompt as shown in figure 6–2.

Figure 6–2 **Main Menu**

```
0 = EXIT UTILITY
1 = MASTER CNF FILE
2 = JCL FILE
3 = CNF FILE

Please Select Type of File ==>
```

To modify the master configuration file, you select option **1** and press **RETURN**. The system displays a listing of the master configuration file, followed by the Function Menu. The Function Menu allows you to choose whether you want to add the entries for a processor board or delete the entries for a processor board.

The Function Menu and prompt display as shown in figure 6–3.

Figure 6–3 **Function Menu**

```
0 = RETURN TO MAIN MENU
1 = ADD
2 = DELETE

Please Select a Function for the Master CNF File ==>
```

Adding Processor Entries

To add the appropriate entries for a processor, you select option 1 in response to the Function Menu prompt and press **RETURN**. The system displays the Add Menu, from which you can select the type of processor that you have added to the system.

The system displays the Add Menu and prompt as shown in figure 6–4.

Figure 6–4 **Add Menu**

```
0 = RETURN TO FUNCTION MENU
1 = CP
2 = DP
3 = FP
4 = SP
5 = TP

Please Select Processor Board to Add to the Master CNF ==>
```

You select the number that corresponds to the type of processor you have added to the system and press **RETURN**. The system displays the Add Board Menu and prompt. The Add Board Menu allows you to select the location in the master configuration file at which the processor entries should appear.

The Add Board Menu lists each of the processors that contain entries in the master configuration file. In between the processor name are numbered locations at which you can add the new processor entries.

The system displays the following prompt after the Add Board Menu:

Please Select the Location to Add the Processor Board
==>

You select the number that corresponds to the appropriate location and press **RETURN**.

Caution: The location that you select must correspond to the physical location among the processor boards at which you added the new processor. That is, the sequence of processor entries in the master configuration file must always correspond exactly to the physical sequence of processors in the XE master enclosure(s) (that is, by slot number order).

When updating the master configuration file, the mBTOS CONFIG utility adds the appropriate entries to the master configuration file. If the processor you add requires an include statement for its configuration file, the mBTOS CONFIG utility automatically adds the include statement. The mBTOS CONFIG utility also updates the initialization and configuration file names for any processors that follow the new processor and are of the same type. (For example, if you add a new CP to the system between CP01 and CP02, the mBTOS CONFIG utility automatically renames files related to CP02 to reflect its new number, CP03.)

Deleting Processor Entries

To delete the appropriate entries for a processor, you select option 2 in response to the Function Menu prompt and press **RETURN**. The system displays the Delete Board Menu, from which you can select the processor that you have removed from the system.

The Delete Board Menu lists the processors included in the current master configuration file. The system displays the following prompt after the Delete Board Menu:

Please Select Processor Board to Delete from the Master Cnf ==>

You select the number that corresponds to the board that you removed from the system and press **RETURN**. The system displays the updated master configuration file, and returns the Function Menu to allow for further modifications.

When updating the master configuration file, the mBTOS CONFIG utility deletes the appropriate entries to the master configuration file. If the processor you deleted had an include statement for its configuration file, the mBTOS CONFIG utility automatically deletes the include statement. The mBTOS CONFIG utility also updates the initialization and configuration file names for any processors that followed the processor that was removed and are of the same type. (For example, if the system had CP01 and CP02, and you removed CP01, the mBTOS CONFIG utility automatically renames files related to CP02 to reflect its new number, CP01.)

Creating or Modifying Processor Configuration Files

You can perform eight operations with processor configuration files:

- selectively creating or modifying processor configuration files
- creating the default version
- modifying an existing file or creating a nondefault file
- adding a TP RS–232–C port entry
- adding a CP RS–232–C port entry
- adding a CP RS–422 cluster line entry
- deleting a port or block entry
- adding or modifying an X, Y, or Z block entry

To modify the files, you invoke the mBTOS CONFIG utility. You type **MBTOS CONFIG** at the Executive. The system displays the main Default Menu and prompt as shown in figure 6–1.

Selectively Creating or Modifying Processor Configuration Files

To create or modify a processor configuration file, you select option 1 in the main Default Menu and press **RETURN**. When the system displays the Main Menu, you can select the type of file you want to create or modify.

The system displays the Main Menu and prompt as shown in figure 6–2.

Note: The mBTOS CONFIG utility refers to processor configuration files as CNF files.

To modify a processor configuration file, you select option 3 and press **RETURN.**

The system displays the Board Menu, which allows you to choose which processor's configuration file you want to create or modify. The mBTOS CONFIG utility examines the master configuration file to generate the list of processor boards.

The system displays the following prompt after the Board Menu:

Please Select a Specific CNF file ==>

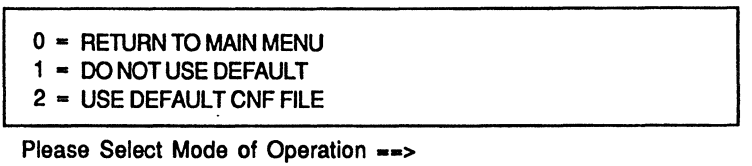
Select the number corresponding to the processor board whose configuration file you want to create or modify, and press **RETURN**. The CNF Default Menu appears and allows you to:

- create a default configuration file for the processor
- create your own configuration file for the processor
- modify the processor's existing configuration file

Note: Currently, the mBTOS CONFIG utility can only add or modify Y or Z block allocation entries in FP, DP, or SP configuration files. To selectively create an FP, DP, or SP configuration file, you must use the default version of the file. If you must modify entries in an FP, DP, or SP configuration file other than Y or Z block entries, use the BTOS Editor.

The system displays the CNF Default Menu and prompt as shown in figure 6–5.

Figure 6–5 **CNF Default Menu**



Creating the Default Version

To create the default version of the processor configuration file, you select option 2 and press **RETURN**. The system creates and displays the default configuration file.

Note: The mBTOS CONFIG utility copies the contents of the general default configuration file corresponding to the processor board type into the processor configuration file. If the processor configuration file does not already exist, the mBTOS CONFIG utility opens a new file before the copy is made. If processor configuration file does exist, BTOS overwrites it during the copy operation.

After the system displays the new configuration file, the mBTOS CONFIG utility returns to the Main Menu.

Modifying an Existing File or Creating a Nondefault File

To modify an existing TP or CP processor configuration file or to create a nondefault one, you select option 1 in response to the CNF Default Menu prompt and press **RETURN**. If the file already exists, the system displays its contents. If the file is new, an empty file results.

After the system lists the configuration file, it displays a Function Menu, which allows you to choose whether you want to add or delete a port definition entry.

The system displays the Function Menu and prompt as shown in figure 6–3.

The following subsections describe the procedures for adding or deleting entries to TP and CP configuration files

---

Caution: A CP configuration file must contain at least one async entry for the CP to boot.

Adding a TP RS–232–C Port Entry

Note: If you select a port entry that is already in the file, the system tells you that you have selected a duplicate entry and to try again. To modify an existing port entry, you must first delete the entry from the file and then add the new version of it.

To add an RS–232–C port entry to a TP's configuration file, you select option 1 in response to the Function Menu and press **RETURN**. The system displays a prompt that allows you to select the port entry you want to add or to return to the Function Menu. The system displays the following prompt:

*** Valid answers are numbers between 1 and 10 ***
Press 0 to Return or Insert a Port Number to Configure
==>

Select the number corresponding to the RS–232–C port entry you wish to add and press **RETURN**. The system displays the following:

The Current Line Being Added
async n, speed=1200, parity=none, stopbits=1, charbits=8

n is the port number that you selected. This display of the port entry is followed by a Change Line Menu.

The Change Line Menu allows you to:

- include the selected port entry in the TP configuration file
- cancel the addition of the selected port entry and return to the Port Menu to select another port
- change the line speed defined in the selected port entry

The system displays the Change Line Menu and prompt as shown in figure 6–6.

Figure 6–6 **Change Line Menu**

```
0 = RETURN TO ADD MENU
1 = PORT
2 = SPEED

Please Select the Parameter to Change ==>
```

To add the port entry as displayed to the TP configuration file, you select option 0 and press **RETURN**. After the entry is added, the system displays the updated TP configuration file, and the Add Menu and prompt to allow further modifications.

To cancel the addition of the port entry, you select option 1 and press **RETURN**. The entry is not added, and the system displays the port selection prompt to allow you to select another port.

To change the line speed defined in the port entry, you select option 2 and press **RETURN**. The system displays the Speed Menu and prompt, which allows you to set the line speed for the RS–232–C port. The values provided are in baud. The Speed Menu also allows you to return to the Change Line Menu.

The system displays the following prompt after the Speed Menu:

Please Select a Speed ==>

You select the number corresponding to the desired speed and press **RETURN**. The system displays the modified port entry, followed by the Change Line Menu. The port entry is not actually added to the TP configuration file until you return to the Add Menu.

Adding a CP RS–232–C Port Entry

Note: If you select a port entry that is already in the file, the system tells you that you have selected a duplicate entry and you should try again. To modify an existing port entry, you must first delete the entry from the file and then add the new version of it.

To add an RS–232–C port entry to a CP's configuration file, you select 1 in response to the Function Menu and press **RETURN**. The system displays an Add Menu, which lists the CP's port types. The system displays the following prompt after the Add Menu:

Please Select an Item to Configure ==>

You select the number corresponding to RS–232–C and press **RETURN**. The system displays a Port Menu listing the CP's RS–232–C ports.

The system displays the following prompt after the Port Menu:

Please Select a Port to Configure ==>

You select the number corresponding to the port entry you wish to add or modify and press **RETURN**. The system displays the following:

The Current Line Being Added
async n, speed=1200, parity=none, stopbits=1, charbits=8

n is the port number that you selected. After the system displays the port entry, it displays a Change Line Menu.

The Change Line Menu allows you to:

- include the selected port entry in the CP configuration file
- cancel the addition of the selected port entry and return to the Port Menu to select another port
- change the line speed defined in the selected port entry

The system displays the Change Line Menu as shown in figure 6–6.

To add the port entry as displayed to the CP configuration file, you select option 0 and press **RETURN**. BTOS adds the entry, displays the updated CP configuration file, and displays the Add Menu and prompt again to allow you to make further modifications.

To cancel the addition of the port entry, you select option 1 and press **RETURN**. BTOS does not add the entry, but it displays the Port Menu and prompt again to allow you to select another port.

To change the line speed defined in the port entry, you select option 2 and press **RETURN**. The system displays the Speed Menu and prompt, which allows you to set the line speed for the RS–232–C port. The values provided are in baud. The Speed Menu also allows you to return to the Change Line Menu.

The system displays the following prompt after the Speed Menu:

Please Select a Speed ==>

You enter the number corresponding to the desired speed and press **RETURN**. The system displays the modified port entry, followed by the Change Line Menu. BTOS does not add the port entry to the CP configuration file until you return to the Add Menu.

Adding a CP RS–422 Cluster Line Entry

Note: If you select a line entry that is already in the file, the system tells you that you have selected a duplicate entry and you should try again. To modify an existing line entry, you must first delete the entry from the file and then add the new version of it.

To add an RS–422 cluster line entry to a CP's configuration file, you enter **1** in response to the Function Menu and press **RETURN**. The system displays an Add Menu, which lists the CP's port types. The Add Menu is followed by the prompt:

Please Select an Item to Configure ==>

You enter the number corresponding to RS–422 and press **RETURN**. The system displays a Line Menu listing the processor's RS–422 lines.

The Line Menu is followed by the prompt:

Please Select a Line to Configure ==>

You enter the number corresponding to the line entry you want to add or modify and press **RETURN**. The system displays the following:

The Current Line Being Added
line n, clock=307k

n is the line number that you selected. After the system displays the line entry, it displays the Change Line Menu.

The Change Line Menu allows you to:

- include the selected line entry in the CP configuration file
- cancel the addition of the selected line entry and return to the Port Menu to select another line
- change the line speed defined in the selected line entry

The system displays the Change Line Menu as shown in figure 6–6.

To add the line entry, as displayed, to the CP configuration file, you enter **0** and press **RETURN**. BTOS adds the entry, displays the updated CP configuration file, and displays the Add Menu and prompt to allow you to make further modifications.

To cancel the addition of the line entry, you enter **1** and press **RETURN**. BTOS does not add the entry, but it displays the Port Menu again to allow you to select another line.

To change the line speed defined in the line entry, you enter **2** and press **RETURN**. The system displays the Speed Menu, which allows you to set the line speed for the RS-422 line. The values provided are in baud. The Speed Menu also allows you to return to the Change Line Menu.

The Speed Menu is followed by the prompt:

Please Select a Speed ==>

You enter the number corresponding to the desired speed and press **RETURN**. The system displays the modified line entry, then displays the Change Line Menu. BTOS does not add the line entry to the CP configuration file until you return to the Add Menu.

Deleting A Port or Block Entry

To delete an entry from a CP or TP configuration file, you enter **2** in response to the Function Menu and press **RETURN**. The system displays a Delete Line Menu, which lists the entries that are currently in the processor configuration file. It also lists an option that allows you to return to the Function Menu. The Delete Line Menu is followed by the prompt:

Please Select a Line to Delete from the CNF file ==>

You enter the number corresponding to the entry you want to delete and press **RETURN**. The system displays the updated file, and then displays the Function Menu to allow for further modifications.

When you are finished modifying the file, you enter **0** in response to the Function Menu prompt to return to the Main Menu.

Adding or Modifying an X, Y, or Z Block Entry

To add or modify an X, Y, or Z block entry to a processor's configuration file, you enter **1** in response to the CNF Default Menu prompt and press **RETURN**. If the file already exists, the system displays its contents. If the file is new, an empty file results.

The system lists the configuration file, followed by a Function Menu. The Function Menu allows you to choose whether you want to add or delete an entry.

The system displays the Function Menu and prompt as shown in figure 6–3.

Enter **1** in response to the Function Menu and press **RETURN**. The system displays an Add Menu, which lists the types of entries that you can add. The system displays the Add Menu after it displays the prompt:

Please Select an Item to Configure ==>

You enter the number corresponding to an X, Y, or Z block entry and press **RETURN**. The system displays the Block Menu and prompt, which lists the different blocks you can add or modify. This menu is followed by the prompt:

Please Select a Block to Configure ==>

You enter the number corresponding to the block you want to add or modify. If a block entry exists, the following message appears:

The Current Line Being Added
BlockType=n, Number=xxx
*** Valid answers are numbers between 000 and 200 ***
Press 000 to Return or Insert the Number of Blocks to Configure ==>

n is the block type you selected.
xxx is the current number already configured.

If that block entry does not exist, the first two lines of the previous messages do not appear.

You enter the desired number of blocks for the chosen block type and press **RETURN**. You must enter a three-digit number (for example, to specify 12 blocks, enter **012**). The mBTOS CONFIG utility adds or updates the current block entry to the configuration file as specified, displays the new block entry, and returns to the Block Menu.

To leave the current block entry unchanged, you enter **000**. The mBTOS CONFIG utility returns to the Block Menu.

Creating or Modifying Processor Initialization Files

There are three operations you can perform upon processor initialization files:

- selectively creating or modifying files
- creating the default version
- modifying an existing file or creating a nondefault file

To modify the files, you invoke the mBTOS CONFIG utility. You type **MBTOS CONFIG** at the Executive. The system displays the main Default Menu and prompt as shown in figure 6-1.

Selectively Creating or Modifying Processor Initialization Files

Note: Before you attempt to modify processor initialization files, you must know the restrictions regarding where you can run system services, how many copies of a given system service you can run, and so on. For more information, refer to section 7 for guidelines on running services.

The system displays the main Default Menu and prompt as shown in figure 6-1.

To create or modify a processor initialization file, you select option 1 and press **RETURN**. The system displays the Main Menu, from which you can select the type of file you want to create or modify.

The system displays the Main Menu and prompt as shown in figure 6–2.

Note: The mBTOS CONFIG utility refers to processor initialization files as JCL files.

To modify a processor initialization file, you select option 2 and press **RETURN**.

The system displays the Board Menu; you choose which processor's initialization file you want to create or modify at the menu. The mBTOS CONFIG utility examines the master configuration file to generate the list of processor boards.

The system displays the following prompt after the Board Menu:

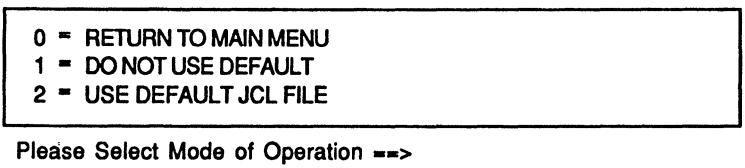
Please Select a Specific JCL file ==>

You select the number corresponding to the processor board whose initialization file you want to create or modify and press **RETURN**. The JCL Default Menu appears. This menu allows you to:

- create a default initialization file for the processor
- create your own initialization file for the processor
- modify the processor's existing initialization file

The system displays the JCL Default Menu and prompt as shown in figure 6–7.

Figure 6–7 **JCL Default Menu**



Creating the Default Version

To create the default version of the processor initialization file, you select option 2 and press **RETURN**. The system creates and displays the default initialization file.

Note: The mBTOS CONFIG utility copies the contents of the general default initialization file corresponding to the processor board type into the processor initialization file. If the processor initialization file does not already exist, the mBTOS CONFIG utility opens a new file before it makes the copy. If the processor initialization file does exist, BTOS overwrites during the copy operation.

After the system displays the new initialization file, the mBTOS CONFIG utility returns to the Main Menu.

Modifying an Existing File or Creating a Nondefault File

To modify the existing processor initialization file or to create a nondefault one, you select option 1 in response to the JCL Default Menu prompt and press **RETURN**. If the file already exists, the system displays its contents. If the file is new, an empty file results.

After the system lists the initialization file, it displays a Function Menu. The Function Menu allows you to choose whether you want to add or delete a system service entry.

The system displays the Function Menu and prompt as shown in figure 6–3.

To add a system service to the file, you select option 1 and press **RETURN**. The system displays an Add Server Menu and prompt; this menu lists the system services that you can run on the processor.

The system displays the following prompt after the Add Server Menu:

Please Select a Server to Add to the JCL file ==>

You select the number corresponding to the service you want to add and press **RETURN**. The system displays the updated file, and then displays the Function Menu and prompt to allow for further modifications.

To delete a system service from the file, you select option 2 and press **RETURN**. The system displays a Delete Server Menu and prompt, which lists the system services that BTOS is currently running on the processor.

The system displays the following prompt after the Delete Server Menu:

Please Select a Server to Delete from the JCL file ==>

You select the number corresponding to the service you want to delete and press **RETURN**. The system displays the updated file, and then displays the Function Menu and prompt to allow for further modifications.

When you are finished modifying the file, select option 0 in response to the Function Menu prompt to return to the Main Menu.

Using the mCREATE CONFIGURATION FILE Utility

You use the mCREATE CONFIGURATION FILE Utility to:

- define operating parameters for system printers
- define operating parameters for tape drives
- define operating parameters for data communication equipment

Before you invoke the utility, you should be aware of BTOS device configuration file names and file default parameters.

I/O Device Configuration File Names

You normally assign I/O device configuration file names that identify the device. For example, you can assign printer configuration names that identify the processor and channel they are connected to. The following printer configuration file name is an example of an I/O device configuration file name for a printer connected to channel C (that is, channel 3) of processor TP00:

[sys]<sys>SPLCConfigTp00.sys

The characters SPLC are included to indicate that the file is a spooler–related configuration file. BTOS appends the term .sys to indicate a system service file and stores the . file in the directory <sys> with other spooler–related files.

Default Parameter Values

When you create a new configuration file, BTOS displays standard parameter default values in square brackets ([ ]) at the end of each prompt.

Note: The default values shown in the following description of this command are not necessarily the default values your software release provides.

When modifying a previously created configuration file, the parameter values currently in the configuration file display in the square brackets, rather than the standard default values. This allows you to change one or more parameters in the file without having to reenter values for all the parameters.

Invoking the mCREATE CONFIGURATION FILE Utility

You use the mCREATE CONFIGURATION FILE command to invoke the utility. The utility is menu–driven and allows you to create or modify the I/O device configuration files through menu selections.

The mCREATE CONFIGURATION FILE command does not have a command form. When you enter the command name and press **GO**, BTOS invokes the menu–driven facility.

To invoke the mCREATE CONFIGURATION FILE utility, complete the following:

1 Type **mCreate Configuration File** at the BTOS Executive command line.

2 Press **GO**.

The following prompt appears:

Enter Configuration File Name:

3 Type the name of the new configuration file you want to create, or the name of an existing file you want to modify.

4 Press **RETURN**.

The following prompt appears:

Tape, Parallel Printer, Serial Printer, Communications:

5 To select the device type for the device for which you are creating a configuration file, specify the first letter for one of the above device types (such as, t, p, s, or c).

6 Press **RETURN**.

The following prompt appears:

<CR> to use [Default], <GO>/ESC when all satisfied.

The system also displays the first parameter prompt for the configuration file that you are creating or modifying.

For this and for subsequent prompts, you can enter a new value or you can accept the default value, displayed in square brackets, by not entering any value.

7 To advance to the next prompt, press **RETURN**.

If you press **RETURN** after the last prompt, you loop back to the first prompt.

8 When you have entered the values you want for all of the prompts, press **GO**.

The following prompt appears:

Continue to Configure?

9 Press **GO** to create or modify another configuration file.

The system again prompts you for input.

If you do not want to create or modify another configuration file, press **FINISH** to exit the mCREATE CONFIGURATION FILE utility.

Device Type Prompt

A different set of prompts displays for each device type. The following subsections describe the different sets of prompts.

Tape Parameter Prompts

Record Size [10240]	This is the record size for fixed–length records and the maximum size for variable–length records. BTOS uses only even–value record sizes. The maximum value it uses is 16384 (16 Kb).
High Speed Tape [Yes]	If you accept the default, the tape travels at 100 IPS (inches per second); enter **no** for 25 IPS. System configuration changes are needed to use high speed tape.
High density mode [No]	Unisys does not support this parameter. The default is Single–Density mode, which you cannot override.
Rewind Tape on Close [Yes]	Enter **no** to stop the tape from automatically rewinding when a tape operation is completed.
Variable Length Records [No]	Enter **yes** if you want to specify different record sizes in different tape requests.

Parallel Printer Parameter Prompts

TAB Expansion Size [8]	Enter the number of blank spaces into the tab character you want to convert.
Characters Per Line [132]	This is the maximum number of characters in a print line.
Transmit Time Out – number of seconds [0]	This is the number of seconds a write operation waits to begin transmitting a character to the printer before BTOS returns the error code 300 (**Device not ready**). You set this value to any value other than 0.
Additional ACK Delay – number of 100 microseconds [0]	Specify the extra amount of time (beyond the normal 10–20 microseconds) for the system to wait between receiving an ACK signal from the printer and sending a character to the printer. BTOS requires this for some printers that do not fully conform to the XE master Centronics interface.
Newline Mapping Mode – Binary, CR, or CR/LF [CR/LF]	This parameter determines the mapping, or translation, of carriage return characters (hex 0A) sent from the system to the printer. Binary causes no translations. CR causes a translation to hex 0D (an ASCII carriage return). CR/LF causes a translation to hex 0D,0A (an ASCII carriage return and line feed).

Translation File: [name]	Enter the name of the translation file that BTOS uses to perform character translation. If a translation file exists, its name appears in brackets after the **Translation file** prompt. Leave this field blank if you do not want BTOS to perform character translation.

Serial Printer Parameter Prompts

Data Bits – 5, 6, 7 or 8 [7]	This is the number of bits per character, excluding parity bits.
Parity – None, Even, Odd, 0 or 1 [Even]	This is the state of the parity bit.
Baud Rate – 110 to 19200 [1200]	This is the transmission speed. Common values are 110, 150, 300, 1200, 2400, 4800, and 9600.
Stop Bits – 1 or 2 [1]	This is the number of stop bits per character.
Transmit Time Out – number of Seconds [60]	This is the number of seconds a write operation on the system waits to begin transmitting a character to the printer before BTOS returns erc 300 (**Device not ready**). You set the value to any value other than 0.
Newline Mapping Mode – Binary, CR, or CR/LF [CR/LF]	This parameter determines the mapping, or translation, of carriage return characters (hex 0A) sent from the system to the printer. Binary causes no translations. CR causes a translation to hex 0D (an ASCII carriage return). CR/LF causes a translation to hex 0D,0A (an ASCII carriage return and line feed).

Line Control – None, XON/XOFF, CTS, or Both [XON/XOFF]	This parameter determines the line protocol BTOS uses with the serial printer. None causes BTOS to establish no line control. XON/XOFF stops transmission when the serial printer receives an XOFF character (hex 13); when it receives an XON character (hex 011), it resumes transmission. CTS suspends transmission when the serial printer does not receive the CTS signal from the XE master.
TAB expansion size [8]	Enter the number of blank spaces into the tab character you want to convert.
Characters per line [132]	This is the maximum number of characters in a print line.
Current Translation File [none]	Enter the name of the translation file you want BTOS to use to perform character translation. If a translation file exists, its name appears in brackets after the **Translation file** prompt. Leave this field blank if you do not want BTOS to perform character translation.

Communications Device Parameter Prompts

Data Bits--5, 6, 7 or 8 [7]	Enter the number of bits per character. Data bits does not include the parity bit if parity is even, odd, 0, or 1.
Parity – None, Even, Odd, 0, or 1 [0]	Enter the state of the parity bit as a check on the data bits. When specifying **None**, increase the number of data bits to account for the absence of a parity bit.
Baud rate (110 to 19200) [9600]	Enter the baud rate. Baud rate is a transmission speed from 20 to 19200 bits per second. The Transmit and Receive baud rates are usually the same, except where hardware allows the rate to be different. Common values are 110, 150, 300, 1200, 2400, 4800, and 9600 bps.
Stop Bits–1 or 2 [1]	Enter the number of stop bits per character.
Transmit timeOut–Number of Seconds [60]	Enter the number of seconds a write operation on the system waits to begin transmitting a character to the device before BTOS returns error code 300 (**Device not ready**).
Receive Time Out–Number of Seconds [60]	Enter the number of seconds a read operation on the system is to wait for data before returning the error code 602 (**No character available**). The default value, 65535, causes a timeout of 0 seconds (that is, an immediate return). Specifying the value 0 causes an infinite timeout (that is, the read operation waits indefinitely).

CR/LF mapping mode – Binary, Newline [Newline]	Enter **Binary** or **Newline**. This parameter determines the mapping of CR/LF characters sent from the communication device to the system. Binary causes no translations. Newline causes a CR, LF, or a CR/LF pair to be translated into a carriage return (0Ah).
Newline mapping mode – Binary, CR, CR/LF [CR/LF]	Enter **Binary**, **CR**, or **CR/LF**. This parameter determines the mapping of carraige return characters (0Ah) the system sends to the communication device. Binary causes no translations. CR causes a translation to 0Dh (an ASCII carriage return). CR/LF causes a translation to 0Dh/0Ah (an ASCII carriage return and line feed.
Line control--None, XON/XOFF, CTS, or Both [XON/XOFF]	Enter **None**, **XON/XOFF**, **CTS**, or **Both**. This field determines the line control mode to be used by the receiving device to control the flow of data. None selects no line control. XON/XOFF selects suspension of transmission from the time of receipt of an XOFF character (hex 13) until it receives an XON control character (hex 011). CTS selects suspension of transmission when the Clear–To–Send signal is not received or if the Clear–To–Send signal is not received.

End of File byte--None or hex value [04]	Enter the hexadecimal value of the byte to compare with the received byte to detect the end of the file. If you specify **None**, status code 1 (**End of file**) is never returned from a communications byte stream. The default 04 is the ASCII code for the End-of-Transmission character.
Characters per line [132]	Enter the maximum number of characters in a print line.
TAB expansion size [8]	Enter the number of blanks into which you want to map a TAB character.

Optimizing Your XE Master Performance

Once you have configured your XE master to fit your specific software or hardware requirements, you can enhance your XE master's performance by using the procedures described in this section. Specifically, this section tells you how to:

- manage your XE master with system services
- effectively place system services on processors to save memory space
- use the XE master's key switch to increase performance
- alter X, Y, and Z settings to increase speed
- use mPARTITION STATUS utility to improve performance
- improve tape server performance
- improve file access throughput
- maintain your XE master

Managing Your XE Master with System Services

XEBTOS provides system services that control access to software applications and peripheral devices. These system services run on XE master processor boards.

The mBTOS CONFIG utility allows you to install system services on specific processor boards. Table 7–1 lists the available system services, their corresponding run file names, and the amount of memory they require. For more information on the mBTOS CONFIG utility, refer to section 6.

Table 7–1 **XEBTOS System Services and Run Files**

System Service	Run File	Memory
AdminAgent	[sys]<admin>MFAdminAgent.run	180 Kb
Queue Manager	[sys]<sys>QueueMgr.run	40 Kb
Printer Spooler Manager	[sys]<admin>mSpoolerMgr.run	71 Kb
Tape Server	[sys]<admin>mTapeServer.run	80 Kb
QIC Server	[sys]<admin>mQicServer.run	85 Kb

Queue Manager and Printer Spooler Manager are described in section 8.

The BTOS software uses processor initialization files to install the system services onto appropriate processor boards. You modify or create the initialization files with the mBTOS CONFIG utility. The system reads these initialization files when you load BTOS into the XE master processor boards, that is, when the system boots up.

Guidelines for Running System Services

Restrictions apply as to how mBTOS CONFIG handles adding system services. These restrictions include the type of processor on which a system service can run, the number of copies of a system service that can run in the system, and whether system services can run in a primary or secondary partition. Table 7–2 lists the system services and applicable restrictions.

If you receive the BTOS error code 400 (**Out of Processor Memory**), use the PLOG command to list the contents of [sys]<sys>log.sys. If the log states that the 400 error occurred because too many servers are installed on the processor, you should add a Memory Expansion (ME) board to the processor or move system services to another processor.

Table 7–2 **Restrictions for XEBTOS System Services**

System Service	Runs On	Number	Partition
AdminAgent	Any	One per system	Primary
Queue Manager	Any	One per system	Secondary
Printer Spooler Manager	CP, TP	One per CP or TP	Primary or Secondary
Tape Server	DP or SP	One per system	Secondary
QIC Server	Any	One per system	Secondary

Note: If you run both 1/2" and QIC tape drives on one system, the Tape Server and QIC Server must not run on the same processor board, and the Tape Server must be installed before the QIC Server.

Format for System Service Run Statements

The processor initialization file is a subset of a type of file called a JCL (Job Control Language) command file. The Command Line Interpreter (CLI) is a program that reads and executes the statements in a JCL command file.

A run statement is one of the types of statements you can include in a JCL command file. The format for a run statement in a JCL file is $run runfile, parameters.

runfile is the full path name of the desired run file.

parameters is a list of parameters related to the run file. Parameters are separated by commas.

Each processor initialization file comprises only run statements. You use one or more run statements to load and activate a given system service on the processor.

At boot time, the system activates CLI; the CLI then reads its input from the processor initialization files. The master utilities, whose run files are included in an initialization file, execute on that processor, thereby installing the corresponding system services.

AdminAgent

AdminAgent is the system service that manages the execution of master utilities (M commands such as mIVolume) on XE master processors.

Note: To run an AdminAgent on a processor, the processor must have 768 Kb of memory.

The AdminAgent runs in the primary partition of the processor whose initialization file contains the AdminAgent run statement. The run file for AdminAgent is [sys]<admin>MfAdminAgent.run.

Only one processor per system can be running AdminAgent. Also, using AdminAgent, only one user can execute master utilities at a time.

If you want to run AdminAgent, include the run statement for [sys]<admin>MfAdminAgent.run in a processor's initialization file.

Note: Some XEBTOS commands require that the AdminAgent run on the master (FP or DP) processor board.

Obtaining AdminAgent Status Information

To obtain status information about the AdminAgents in the system, you use the mADMIN AGENT STATUS command.

For an AdminAgent, the status information indicates the processor on which the AdminAgent is running.

To execute the mADMIN AGENT STATUS command, you enter **mAdmin Agent Status** at the BTOS Executive command line and press **GO**. Status information displays on the screen.

mTape Server

MTape Server is a system service that is installed on the XE master board that connects to a half–inch tape drive (DPs or SPs only).

Note: If you run both 1/2" and QIC tape drives on your system, mTape Server must be installed before mQic Server; and you should not run mTape Server and mQic Server on the same processor board. You can use the Sync command to accomplish this (refer to the heading "Synchronizing the Installation of System Services" in your *XE500 BTOS Administration Guide).*

To install the mTape Server, you include the following commands in the processor initialization file for each processor board attached to a half–inch tape drive:

```
$Run [sys]<sys>CreatePartition.run,size,part
$Run [sys]<admin>mInstallServer.run,part,&
      [sys]<admin>mTapeServer.run,units,buffsize
```

The parameters for CreatePartition.run are as follows:

size — the partition size required by the mTape Server. The recommended value is 180 Kb. To determine the minimum size of the partition for mTapeServer, use the following formula:

(3 x buffsize) + 20K

part — the partition name the mTape server is installed into. This name can be up to 12 characters long and must be used in the mINSTALL SERVER command.

The parameters for mTapeServer.run are as follows:

units — units is the number of half–inch tape drives connected to this processor.

buffsize — buffsize is the size of the mTape Server buffers. The default is 10 Kb. This parameter must be between 1 and 64.

Buffering for the mTape Server

Buffering determines the efficiency of disk/tape data transfers. It is very important to install the tape servers with correct buffering.

If the record size is the same, a half–inch tape the server creates with plenty of buffers is physically identical to one the server creates with few buffers.

The two most important considerations are speed and memory. In general, the more memory used, the faster the speed. The minimum arguments to mTape Server are one for the number of tape drives (units) and one for the buffer size (buffsize). The space required for the buffers is:

units x buffsize x 2

Also, be sure that you install mTape Server with a buffer size equal to the record size in your tape configuration file. If it is not, you waste extra space.

Allocating Buffers for the mTape Server

If you install AdminAgent on a different board from mTape Server, you need buffers. If you allocate the correct amount of buffers, you can save 80 Kb of buffers and keep your tape streaming continuously.

You allocate twenty 4–Kb buffers or four 20–Kb buffers to save enough buffers to keep the tape streaming continuously. (The tape configuration file states the record size.) The difference between using many small buffers and a few large buffers is that it takes longer to fill up the large buffers. Your goal is to keep the tape moving (streaming). The mTape Server does not write partial buffers, so it waits for the twenty Kb buffers to fill up instead of continuously writing tape records. The four Kb buffers fill up quickly. Since mTape Server can fill a buffer while simultaneously writing to tape, by the time BTOS writes one small buffer, the next buffer is full.

You need only two buffers, and they should be large enough so that it takes as long to write one buffer to tape as it does to fill the other buffer from disk. This situation is almost impossible to predict, so you should experiment.

To allocate buffers, perform the following:

1. Remove all other servers from the DP or SP.
2. Allocate a generous number of large buffers.

   The tape should stream when you are doing a backup.
3. Gradually decrease the size of the buffers until the tape no longer streams, then use the smallest size at which the tape still streams.
4. Repeat the process, decreasing the number of buffers. Remember to allocate more, rather than fewer, buffers so that you will not have performance problems if the system load changes.

Do not be concerned if the Restore operation does not stream. Backup (reading from disk and writing to tape) is generally faster than Restore (reading from tape and writing to disk). During the Restore operation, the tape utilities not only have to write the data to disk, they have to unformat the disk records from the tape record, create directories when necessary, and update entries in Mfd.sys and FileHeaders.sys. By contrast, reading from disk during backup is done quickly enough to keep mTape Server busy.

Another factor is that the mTape Server writes an interrecord gap of 3/4 of an inch. This means that the smaller the records, the more interrecord gaps there are on the tape. However, this should not be a problem if you use 2400-foot tapes.

mQIC Server

With mQIC Server, you can determine a limit by experimenting with partition sizes. You create a partition just large enough for mQIC Server to install, and just small enough for mQIC Server not to install if you decrease the size of this partition. That size is the size required for the server code and 40 buffers (20 Kb), which is the minimum partition size. Then, for every 1Kb the partition size is increased, two more buffers are allocated.

To install mQIC Server, include the following commands in the FP or TP processor initialization file:

```
$Run [sys]<sys>CreatePartition.run,size,part
$Run [sys]<admin>mInstallServer.run,part,&
      [sys]<admin>mQICServer.run,buffers,length,slot
```

The parameters for CreatePartition.run are as follows:

size — the partition size required by the mQIC Server. The recommended size is 100 Kb.

part — the name of the partition the mQIC server is installed into. This name can be up to 12 characters long.

The parameters for mQICServer.run are as follows:

buffers — buffers is the maximum number of buffers to be allocated. The maximum value is 255 and the default is 128.

When installed, the mQIC Server allocates 512–byte buffers until it runs out of memory in its partition, or until it reaches the maximum number of buffers. If mQIC Server cannot allocate at least 40 buffers, it writes an error message to the system log and terminates.

This parameter is currently ignored. It exists as a placeholder so that old SysInit.jcl files continue to function without modification. The system attempts to allocate as many buffers as possible in the partition in which the mQIC Server is loaded. Refer to Buffering for the QIC and Half–Inch Tape Servers.

length — length is the assumed cartridge length (in feet). The default is 600. This parameter is currently ignored. It exists as a placeholder so that old SysInit.jcl files continue to function without modification.

slot — slot is the hexadecimal number that identifies the slot containing the QIC board. The default is slot 77.

Note: If you run both 1/2" and QIC tape drives on your system, mTape Server must be installed before mQic Server; and you should not run mTape Server and mQic Server on the same processor board. You can use the Sync command to accomplish this (refer to the heading "Synchronizing the Installation of System Services" in your *XE500 BTOS Administration Guide).*

Buffering the mQIC Server

The mQIC Server, unlike mTape Server, always requires buffers, regardless of where the tape utility is running.

When writing to tape, the QIC drive's firmware tries to keep the tape moving in the following manner. If BTOS writes to the buffer and is not waiting to write to another buffer, the firmware advances the tape as far as it would take to write the buffer again. It does this in anticipation that a buffer is waiting to write by the time it completes this advance of the tape. If there is no buffer waiting, the drive rewinds back to the end of the record.

BTOS Command Forms and User Command Files

You install the run files for BTOS utilities as part of the BTOS software installation procedure. BTOS autmatically creates the commands to run the utilities as it installs them. (Refer to section 2).

Submit files copy the commands into a command file. Through an entry in the user's signon file, BTOS assigns each user a command file. This command file contains the commands to which a user has access. (For more information about how command files are used, refer to your Standard Software operations documentation.)

By default, commands are copied into the command file [sys]<sys>Sys.cmds. BTOS uses this command file when you log onto the system without entering a user name in the Signon form (that is, the user you defined in the signon file [sys]<sys>.user).

During the software installation procedure, the system copies the workstation commands into [sys]<sys>Sys.cmds. You must now create and copy the XE500 BTOS commands into the default command file and/or user command files.

Creating the Command Forms and Command Files

To create the XE master BTOS command forms and add them to a command file, complete the following:

1 Copy the file [!sys]<sys>Sys.cmds to the user command files you want to create.

At this point, the command file [!sys]<sys>Sys.cmds contains all of the workstation commands and the XE500 BTOS master commands that were added during the installation procedure.

2 Type **Submit** at the Executive command line.

3 Press **RETURN**.

The SUBMIT command form displays on the workstation screen.

4 In the **File List** field, type **[!sys]<cmd>xexxxcmds.sub**. (xxx is your hardware type, for example XE520).

This creates all of the available XE500 BTOS commands.

5 In the **[Parameters]** field, type the name of the user command file to which you want the commands added to. (To add the commands to [!sys]<sys>Sys.cmds, you leave this field blank.)

6 When you have completed filling in the SUBMIT command form, press **GO**.

The operations BTOS requires to create the commands are displayed on the screen. When BTOS creates all the commands, the Executive command line displays.

Repeat this procedure for each group of commands and each command file you wish to create.

If there are any commands in a user command file that you want to remove, use the REMOVE COMMAND command. (For example, you may not want a user to have access to mIVOLUME, mBTOS CONFIG, or other commands with which a user could corrupt system files.)

Placing System Services on Processors to Save Memory

To save memory space on the processor, you can place your system services so that they can be used more efficiently. You use the initialization files, Init.Jcl, to place system services on the XE master's processors (refer to section 6).

You should place system services that do not directly control an external port (for example, ISAM, MfAdminAgent, and Queue manager) on the processor board most closely associated with that service. For example, you can:

- Install ISAM on the FP or DP controlling the disks with the majority of ISAM file activity.
- Install MfAdminAgent on the DP with a tape drive to improve the performance of the backup operation.
- Install Queue Manager on the FP or DP where the queues are located.

System services that directly control an external port (for example, data communication services and Spooler) must reside on the processor containing that port.

After you decide on which processor the system service should reside, you should consider the order of the system services in the .Jcl file. It may be better for you to install the services in a secondary partition. Before deciding to do this, consider:

- the available memory on the processor
- interdependencies between the services (for example, QueueMgr and Spooler, MailServer, ModemServer and CommMgr)

Certain system services, like ISAM and Spooler, do not issue the BTOS ConvertToSys call. If the system does not load these services into a secondary partition, they remain in the primary partition, and the system does not permit other services to load after them. You can use this feature to your advantage. If the processor is short on memory and the service does not release the primary partition, the system does not execute CLI.Run after that service. This can save approximately 60 Kb of memory space on the processor.

Using the XE Master's Keyswitch to Increase Performance

You can position the XE master's four–position keyswitch to optimize performance. The keyswitch settings determine the operating mode for the XE master. (Keyswitch positions are defined in section 5.)

You use the keyswitch positions in conjunction with .Jcl files to determine system service usage during shifts. By using these two features, you can comprise the first shift of online work and the second shift of batch processing.

You put the keyswitch in the NORMAL position for first shift operations, which loads all servers required for online operations. You then put the keyswitch in the REMOTE position for second shift, which eliminates all unnecessary servers and adds any additional servers required for the batch update jobs. You put the keyswitch in the MANUAL position for administrative testing and diagnostics.

The following example .Jcl files provides ISAM, Queue Manager, Spooler, AdminAgent, and Mail/Telex services in NORMAL keyswitch mode and provides AdminAgents only in MANUAL keyswitch mode. The REMOTE keyswitch is the default.

For NORMAL keyswitch mode:

```
File: [!sys]<Sys>InitFp00.n.Jcl
$continueonerror
$run [sys]<admin>InstallQMgr.run,Y,30
;Install Mail Server
$Run [sys]<Admin>MCreatePartition.Run,185K,MS
$Run [sys]<Admin>MInstallServer.Run,MS,&
      [sys]<Sys>MailServer.Run
;
;Install System Admin Agent
;run [sys]<sys>MfAdminAgent.run
;
;Install ISAM Server in secondary partition
;Run [sys]<sys>MfAdminAgent.run
;Run
[sys]<sys>ISAMServer.Run,5,[!sys]<sys>RBaseIsam.Config
$End
```

```
File: [!sys]<sys>InitCp00.N.Jcl
;Install spooler into a secondary partition
$Run [sys]<Admin>MCreatePartition.Run,70K,Spooler
$Run [sys]<Admin>MInstallServer.Run,Spooler,&
      [sys]<sys>MSpoolerMgr.run
;Use next line if Spooler is to be install in the primary
;run [sys]<sys>MSpoolerMgr.run
$End
```

```
File: [!sys]<sys>InitCp01.N.Jcl
;Modem, Comm. and Telex Manager
;The following is the Standard Mail setup.
$run [sys]<admin>McreatePartition.run,70K,MOD
$run
[sys]<admin>MInstallserver.run,MOD,
[sys]<sys>Modemserver.run
$run [sys]<admin>McreatePartition.run,30K,CommPart
$run [sys]<admin>MInstallserver.run,CommPart,&
      [sys]<sys>communicationsmanager.run,commmgr
$run [sys]<admin>McreatePartition.run,50K,TlxPart
$run [sys]<admin>MInstallserver.run,TlxPart,&
      [sys]<sys>TelexTwxManager.run,TlxMgr
$End
```

The MfAdminAgent should be the last service installed on the FP processor.

For MANUAL mode operation:

```
File: InitFp00.M.Jcl
$continueonerror
;[!sys]<Sys>ISAMServer.Run,10,[!sys]<Sys>RBaseIsam.Config
;Run [sys]<sys>IsamServer.Run,10,
      [!sys]<Sys>RBaseIsam.Config
$Run [sys]<sys>MfAdminAgent.run
$End
```

```
File: InitCp00.M.Jcl
;Run [sys]<Admin>MCreatePartition.Run,70K,MSpooler
;Run [sys]<Admin>MInstallServer.Run,MSpooler,&
;[sys]<sys>MSpoolerMgr.run
;run [sys]<sys>MSpoolerMgr.run
$End
```

```
File: InitCp01.m.Jcl
$End
```

Altering X, Y, and Z Blocks to Increase Speed

You increase processing speed by altering the size of the X, Y, and Z blocks. BTOS dynamicaly allocates X, Y, and Z blocks after the operating system boots.

The default size of X and Y blocks is five sectors (5 * 512 bytes = 2560 bytes total). The actual memory used is 74 bytes larger. A five-sector X block equals half the size of the transmission buffer for B26 (and up) workstations. The slower 307kb cluster lines use the smaller transmission size. The default size for the Z block is 100 bytes.When setting up parameters in the configuration files for X, Y, and Z blocks, be sure:

- the size of the X Blocks is the same on each CP board and on every cluster workstation
- the number of X Blocks is at least 1.5 times the number of workstations on the CP
- the size of the Y and Z Blocks is the same on each processor
- the size of the Y Blocks is not smaller than the size of the X Blocks
- you do not delete the **BlockType**= parameter line in the .Cnf files when using released versions of the operating systems.

Note: Changes to the default X, Y, and Z block settings can increase memory requirements; you may require a memory expansion to 768Kb.

You increase XE speed by increasing the size of the X and Y blocks and increasing the line speed. You only increase the Y block size if you are using BNET. (You do not need to increase the X block size if you are using BTOS II.)

Increasing the X and Y block sizes increases the speed at which BTOS loads large files onto the cluster line. Workstation bootup time also decreases. You increase the X and Y block size to 5120 bytes (10 sectors) and increase the line speed to:

line i, clock=2M (i = 1 or 2)

You increase the size of the Z Blocks to 512 bytes. This greatly reduces the number of Y Blocks needed.

For those CP's running short on memory and not running communication servers such as BMULTI or SNA/BSC, you can reduce the number of Y Blocks. A CP with Spooler or BTOS OFIS Mail uses only one Y Block at a time; therefore, if you reduce the number of Y Blocks to two, this reduces the amount of memory required for those buffers.

Using the mPARTITION STATUS Utility to Improve Performance

You use the mPARTITION STATUS utility to determine what is running on the XE master processors. The utility indicates if a server loaded after BTOS created the partition and if BTOS created the partition too large for the service. Both of these operations waste memory. (Refer to your XE500 administration documentation for details on the utility.)

You use the MPSTAT command to get XE500 BTOS performance information. If you indicate ICC in the **[ICC or Disk]** option in the MPSTAT command form, the system shows you which X, Y and Z blocks BTOS is using. If you indicate DISK in the **[ICC or Disk]** option in the MPSTAT command form, the system shows you where the majority of the I/O BTOS is performing.

Figure 7–1 provides an example of the ICC option selected; figure 7–2 provides an example of the disk option selected. Both figures indicate how to interpret the results.

Figure 7–1 **ICC Option in the MPSTAT Command**

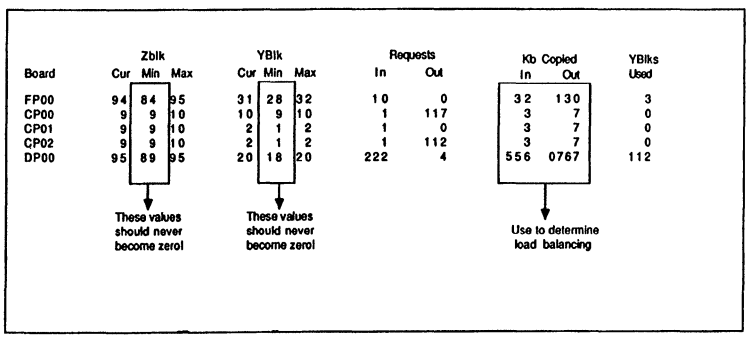

Zblk
YBlk
Requests
Kb Copied
YBlks
Board
Cur Min Max
Cur Min Max
In Out
In Out
Used
FP00 94 84 95 31 28 32 10 0 32 130 3
CP00 9 9 10 10 9 10 1 117 3 7 0
CP01 9 9 10 2 1 2 1 0 3 7 0
CP02 9 9 10 2 1 2 1 112 3 7 0
DP00 95 89 95 20 18 20 222 4 556 0767 112
These values should never become zero!
These values should never become zero!
Use to determine load balancing

Figure 7–2 **Disk Option in the MPSTAT Command**

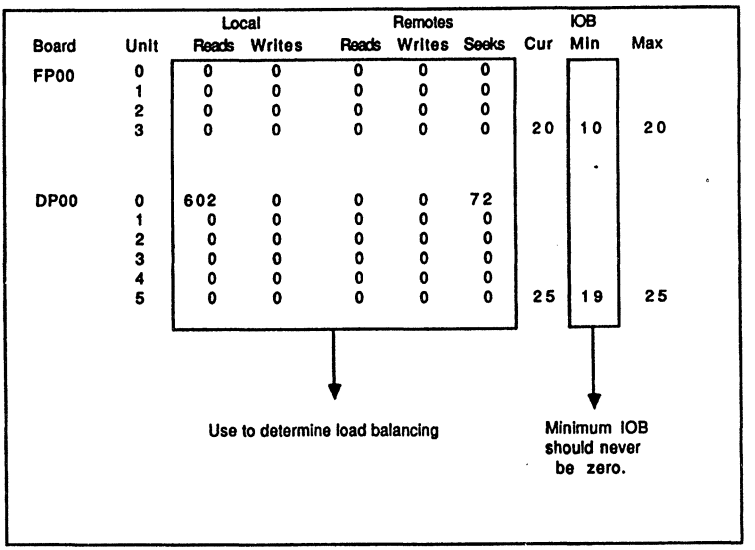


Figure 7–1 depicts a system with two users doing database retrievals. You look at the CP00 and CP02 processors in the example to determine where BTOS produces the requests and where BTOS routes them.

In figure 7–2, most of the I/O is on the first SMD drive. The FP processor's IOB number varies depending on how many processors and system services you are loading; the minimum value is indicated in the **all time low** field.

You may use your system more extensively; therefore, you may see one CP processor saturated. If this is the case, you should swap some users to another CP processor. This balances the load and the lines.

Improving Tape Server Performance

You modify the record size and the tape drive parameters for the Tape Server to increase performance on the XE master. You increase the tape size by modifying the TapeConfig.Sys file. Once you have altered the TapeConfig.Sys file, you modify the tape drive parameters by altering the Init.Jcl file for the SP or DP processors and place the AdminAgent on the SP or DP processor with the Tape Server.

Note: For the following example, the record size should be 8192.

To modify the record size in the TapeConfig.Sys file, you enter a larger number in the **Record Size** field.

To modify the tape drive parameters in the Init.Jcl file for the SP or DP processor, you change the MTapeServer.run to:

$Run [sys]<admin>MTapeServer.run,10,9

This allocates 20 buffers, allowing the tape to stream continously for large files.

Improving File Access Throughput

You improve file access throughput on the XE master by:

- offloading scratch files from the system disk
- balancing disk I/O among the FP or DP processors
- increasing disk efficiency

You can offload the scratch files from the XE master disk by changing a parameter in the FP or DP prefix file. The **[SCR]** parameter designates an arbitrary volume as being the scratch volume. The SysGen.Asm file has a macro definition that checks for the definition of ScratchVolume. If the definition is not there, [sys] is the default.

Refer to procedures in section 4 to balance disk I/O and to increase disk efficiency.

Maintaining the XE Master

To maintain maximum operation of your XE master you should:

- know the maxiumum tape record size for mTape utilities
- restore customized files
- back up your system software

Maximum Tape Record Size for mTAPE Utilities

When using some mTAPE utilities, the maximum record size cannot exceed 10581 bytes. The actual maximum record size can be less depending on the amount of processor memory available to the utility at execution time.

If the tape record size exceeds the actual maximum when BTOS executes the mTAPE utility, the utility fails and BTOS reports the error code 9080.

If you get this error code when running an mTAPE utility, you can try moving system services from the processor on which the Tape Server is running to free up processor memory. Do not try to modify the buffer size specified in the Tape Server run statement. The maximum record size is dependent on how the mTAPE utilities work; it is not dependent on the Tape Server parameters.

Restoring Customized Files

Once you install the system software, you can reinstall any customized system files that you saved.

The following are the only types of customized system files that you can restore:

- device configuration files (files created through the mCREATE CONFIGURATION FILE utility)
- the queue index file, [Sys]<Sys>queue.index
- the printer spooler configuration files (for example, [Sys]<sys>splcnfg.sys (refer to section 8)).

Backing Up System Software

If your system has a hardware failure, it may be impossible to access data stored on a disk. To minimize the impact of such a failure, you should backup (archive) the system files onto half–inch tapes or QIC tapes immediately after completing the system configuration procedures.

In the event that a system failure prevents access to file data, you can restore the archived system files from your tapes.

For information about archiving procedures, refer to your Standard Software operations documentation.

Managing Printers

The Queue Manager and the Spooler Manager are system services that you use on both workstations and the XE master to configure printers. This section describes how to use these services.

The Queue Manager

The Queue Manager controls the various queues in which the system stores related tasks for processing. For example, the Queue Manager controls the queues that are used to handle print requests made through printer spoolers. It can also manage similar queues for data communications processes and user-defined processes.

You install Queue Manager on a master workstation, a standalone workstation, or the XE master (refer to section 2).

The Queue Index File

The queue index file, [Sys]<Sys>Queue.index, is a text file that contains one entry for each queue under the control of the Queue Manager. A queue entry defines:

- the queue's name (to be used by the system)
- the queue entry file to hold the queue's requests
- the size of each queue entry
- the queue type

The Queue.index file includes entries to schedule and control queues and to obtain spooler status. BTOS checks the entries for duplication to ensure that no queue name is used twice and to ensure that different queues do not specify the same queue entry file. If duplication exists, BTOS displays an error message.

Each queue entry has the following format:

QueueName/FileSpec/EntrySize/QueueType

QueueName is a name unique to your installation; it can be any character string except device names such as comm, kbd, lpt, and so on.

FileSpec is the name of the queue entry file in which you store entries from client processes. This file name can be any name you choose; it is recommended that it somehow reflect the name of the queue it serves.

EntrySize is the size of an entry (number of sectors). The system reserves the first 40 bytes for the Queue Manager.

QueueType is the type of queue, numbered according to table 8–1 (Unisys reserves type 0–80; values can range from 0–255):

Table 8–1 **Queue Types**

Queue Type	Assignment
1	Printer spooler queue
2	BSC RJE queue
3	Batch queue
4	SNA RJE queue

Installing the Queue Manager

To install the Queue Manager, include the Queue Manager run statement, $run [sys]<sys>InstallQMgr.run, using mBTOS CONFIG or EDITOR in the desired processor's initialization file. This causes the Queue Manager to be installed automatically at system start–up. The system uses default parameters unless you edit the run statement to include non–default parameters. (Refer to the *XE500 BTOS Administration Guide* for information about including run file parameters in CLI run statements.)

The following run statement causes the Queue Manager to execute using cache storage, with a total of ten queues:

$Run [!sys]<sys>InstallQMgr.run

Ten queues are not sufficient to support the execution of some servers, such as the Generic Print System (GPS/GPAM). When you execute GPS with an insufficient number of queues, the execution fails, GPS does not operate, and the system does not notify you.

To avoid this problem, execute the Queue Manager using cache storage and specify sufficient queues. The following run statement (where y specifies cache storage) establishes ten queues, which may be sufficient, depending on your application:

$Run [!sys]<sys>InstallQMgr.run,y,20

Note: The system must install [sys]<sys>InstallQMgr.run before [sys]<admin>mSpoolerMgr.run. If you are installing these files in separate processor initialization files, this means that the statement $Run [sys]<sys>InstallQMgr.run must run on a processor that boots before the processor containing the statement $Run [sys]<admin>mSpoolerMgr.run, and be configured with appropriate delays or with Sync.run (refer to Synchronizing the Installation of System Services in your *XE500 BTOS Administration Guide*).

Running the Queue Manager

When running the Queue Manager, remember the following:

- You can have only one XE master Queue Manager installed and running at a time.
- The Queue Manager can run on any processor on an XE master.
- On the workstation, you install the Queue Manager on the master workstation only.
- The Queue Manager uses 34 Kb of processor memory. It could use more, depending on whether BTOS uses caching and on the number of queues it controls.

Stopping the Queue Manager

To stop the Queue Manager from running, regardless of how you install it, use the DEINSTALL QUEUE MANAGER command.

To execute the command, complete the following:

1. Type **DeInstall Queue Manager** at the Executive command line.
2. Press **GO**.

   The Queue Manager is deinstalled.

Queue Requests

The following is a list of requests the Queue Manager supports when running on a workstation:

AddQueue
ApplicationSwapped
ApplicationTerminated
DeInstallQueueManager
GetQMStatus
RemoveQueue

For information about other queue requests, refer to your system procedural interface reference documentation.

The Printer Spooler

A printer spooler is a system service that manages the transfer of data from disk files to printers. Spooled printing allows the sharing of printers among many users.

On an XE master, the printer spooler manager running on a CP or TP processor controls the printers connected to that processor. A printer spooler manager can also run locally at a workstation to control printers connected to the workstation. Regardless of where spooler managers are run, all spooled printing queues in the system are controlled by the Queue Manager.

Note: If you are running the Generic Print Service (GPS), refer to your GPS documentation.

What the Printer Spooler Does

The printer spooler controls the following types of operations:

- requesting that a file be printed
- controlling an active printing task (for example, cancelling the task, halting the task, resuming the task after a halt)
- requesting spooler status information

When you make a print request, BTOS places the request in the specified scheduling queue. BTOS processes the requests in order and sends print files out to the printer that is servicing the selected queue.

If more than one printer is servicing a queue, BTOS sends the print file to the first available printer servicing that queue. BTOS uses the information contained in the spooler and printer configuration files to identify the current spooler configuration and the location and operating parameters of the printers.

When BTOS invokes a control operation by means of a command on a particular printer, it places the control request in the printer's control queue. Control requests are then processed in order. The printer spooler places status information on each printer into the spooler status queue.

Standard Spooled Printing System

The standard system software includes utilities and files that allow you to connect one or more printers to your system and begin spooled printing.

The system software includes the following default files for spooled printing.

- two Device configuration files:
  [Sys]<Spl>SplConfig.sys
  [Sys]<Spl>SplBConfig.sys
- a Spooler configuration file, [Sys]<Sys>SplCnfg.sys, containing the following entries:
  0/Parallel/Spl/[Sys]<Spl>SplConfig.sys/130/n
  B/Serial/SplB/[Sys]<Spl>SplBConfig.sys/130/n
- a default Queue.index file, [Sys]<Sys>Queue.index, containing the following entries:
  two print-scheduling queue entries:
    SPL/[sys]<spl>SPL.queue/1/1
    SPLB/[sys]<spl>SPLB.queue/1/1
  two Control Queue entries:
    PARALLELcontrol/[sys]<spl>ParallelControl.queue/1/1
    SERIALcontrol/[sys]<spl>SerialControl.queue/1/1
- one Spooler Status queue entry:
  SPOOLERSTATUS/[sys]<spl>SPOOLERSTATUS.QUEUE/1/1

If your system has a parallel printer connected to a Centronics port, you use the device configuration file:

[Sys]<Spl>SplConfig.sys

If your system has a serial printer connected to Channel B, you use the device configuration file:

[Sys]<Spl>SplBConfig.sys

If you want your Spooler to control a parallel printer, you use the spooler configuration file:

0/Parallel/Spl/[Sys]<Spl>SplConfig.sys/130/n

If you want your Spooler to control a serial printer connected to Channel B, you use the spooler configuration file:

B/Serial/SplB/[Sys]<Spl>SplBConfig.sys/130/n

If you are setting up the Queue.Index file for a parallel printer, you use the print-scheduling queue and control queue:

SPL/[sys]<spl>SPL.queue/1/1

PARALLELcontrol/[sys]<spl>ParallelControl.queue/1/1

If you are setting up the Queue.Index file for a serial printer, you use the print-scheduling queue and control queue:

SPLB/[sys]<spl>SPLB.queue/1/1

SERIALcontrol/[sys]<spl>SerialControl.queue/1/1

On a workstation, you set up the default configuration files to support:

- a printer connected to a standalone workstation or the master of a cluster system
- one parallel and one serial printer connected to the workstation
- a printer with characteristics that match the default parameters (refer to your printer's documentation)

Note: If you use the default configuration file for a serial printer, you must connect the printer to the RS-232C port labeled Channel B.

On the XE master, the default printer spooler files are set up to support:

- a parallel printer connected to the parallel printer port of CP00

  The parallel printer name is mPARALLEL and it services the print queue called mspl.

- a serial printer connected to channel 2 of CP00

  The serial printer name is mSERIAL and it services the print queue called mSPLC.

Custom Spooled Printing System

You must configure a custom spooled printing system if one or more of the following conditions apply:

- your system includes more than one printer of each type (parallel or serial)
- you connect one or more printers to a workstation other than a standalone or master
- you connect one or more printers to a specific processor board in the XE master

To configure a custom system, you revise, replace, or create the following:

- Device Configuration files
- Spooler Configuration files
- Queue.index file entries

Customizing the Device Configuration Files

The system software includes two default Printer Device Configuration files for spooled printers:

[Sys]<Spl>SplBConfig.sys
(serial printer connected to Channel B)

[Sys]<Spl>SplConfig.sys
(parallel printer connected to the Centronics-type port)

For workstations, you can use the default Device Configuration files for one serial and one parallel printer connected to a standalone or master workstation.

If you do not use the default Device Configuration files, you must enter a new Device Configuration file for each additional printer, using the CREATE CONFIGURATION FILE command (or mCREATE CONFIGURATION for an XE master). For detailed instructions on using the mCREATE CONFIGURATION utility, refer to I/O Device Configuration Files in section 6.

Customizing the Spooler Configuration File

For workstations, there is a Spooler configuration file, [sys]<sys>splcnfg.sys, resident on each workstation where the Spooler and the printers it controls are located.

For the XE master, there is one Spooler configuration file, [sys]<sys>splcnfg.sys, for all printer spoolers installed on the XE master processors.

The Spooler configuration file contains an entry for each printer the printer spoolers uses. A printer's entry defines:

- the processor channel the printer is connected to
- the printer's name
- the print scheduling queue that serves that printer
- the printer's configuration file
- the printer's service priority level
- whether a banner is to be printed before each print job sent to the printer
- On the XE master, the CP or TP board the printer is connected to

The system software includes the default Spooler configuration file, [Sys]<Sys>SplCnfg.sys (refer to Standard Spooled Printing System).

The system uses the information in Spooler configuration files to coordinate print operations between the Spoolers and the Queue Manager. For this reason, if you install more than one Spooler, each Spooler configuration file must have a different file name.

For example, if your system includes a master and three cluster workstations (WS1, WS2, and WS3), with printers connected to the master and WS1, you install the Spooler at both the master and WS1. You could use the default file for the master, and create a new file for WS1. The new file would require a different name, such as [Sys]<Sys>WS1SplCnfg.sys.

A Spooler configuration file contains an entry for each printer the Spooler controls. You can revise the entries in the default file, or create a new file using the Editor.

Workstation Spooler configuration file entries appear in the following format:

Channel/PrinterName/QueueName/ConfigurationFile/ Priority/Banner (Y/N)

This entry notifies the spooler that a printer might be added later to the specified channel (refer to Adding a Printer).

An XE master Spooler configuration file entries appear in the following format:

ChannelName/PrinterName/QueueName/PrinterConfigFile/ Priority/BannerOption/Processor

Parameters within both XE master and workstation Spooler configuration files are explained in the following paragraphs.

Channel or **ChannelName** is a single character abbreviation that specifies the channel to which the printer is connected.

Note: Table 8–2 lists the XE master CP and TP printer channels and their abbreviated names. Channels D through J apply only to a TP that is running a big printer spooler manager.

PrinterName is the arbitrary name of the printer. All printers in your installation must have unique names. Also, remember that the printer name chosen here and the one used in the name for that printer's control queue in the queue index must match. For example, if you have named the printer PRINTER1, the control queue name must be PRINTER1control.

QueueName is the name of the printer's scheduling queue. This name must match the name of the scheduling queue listed in the queue index that you want the printer to serve. A scheduling queue can have more than one printer serving it.

Configuration File or **PrinterConfigFile** is the name of the printer's configuration file.

Priority is a numeric value that determines the priority of the printing job going to the printer in relation to other processes running on the processor. Allowable priority values range from 10 to 254, with 10 being the highest priority.

Banner or **BannerOption** is a yes (Y) or no (N) value that determines whether a banner is to be printed at the beginning of each printing job. If you specify Yes, a banner is printed at the beginning of each file; if you specify No, no banner page is printed.

Processor is the name of the XE master processor board to which the printer is connected (for example, CP00, TP01). This field is optional if printers are connected to the CP00 only. If printers are connected to more than one board, and therefore, more than one copy of the Spooler is executing, the field is required.

Table 8–2 **CP and TP Printer Channels**

Name	Processor Channel
0	Parallel printer
A	Channel 1 (sync/async)
B	Channel 2 (sync/async)
C	Channel 3 (async only for CP; sync/async for TP)
D	Channel 4 (sync/async; TP only)
E	Channel 5 (async; TP only)
F	Channel 6 (async; TP only)
G	Channel 7 (async; TP only)
H	Channel 8 (async; TP only)
I	Channel 9 (async; TP only)
J	Channel 10 (async; TP only)

Sample Spooler Configuration File

The following sample Spooler configuration file is configured to support two printers, called SERIAL and PARALLEL on an XE master.

```
0/mPARALLEL/mSPL/[sys]<sys>SPLconfigCp00.sys/64/y/Cp0(
B/mSERIAL/mSPLB/[sys]<sys>SPLCconfigCp00.sys/64/y/Cp00
```

The first entry tells the following information about its corresponding printer:

- the printer is connected to the parallel printer channel
- the printer's name is mPARALLEL

  The printer's control queue name in the Queue.index file is mPARALLELcontrol.
- the printer services the mSPL scheduling queue
- the printer's configuration file name is [sys]<sys>SPLconfigCp00.sys
- the printer's priority level is 64
- a banner will be printed for each printing task sent to the printer
- the printer is connected to CP00

Note that any CP or TP channels BTOS assigns to printers by Spooler configuration file entries it reserves exclusively for printing.

If you do not specify a CP or TP channel in a Spooler configuration file entry, other programs will use the channel.

Customizing the Queue.Index File

The Queue.index file contains the entries that define the system's queues. The system software includes a default Queue.index file, [Sys]<Sys>Queue.index (refer to Standard Spooled Printing System).

To create additional queues, you use the Editor to add entries to the default Queue.index file, or replace it with a new file. The Queue.index file includes three types of entries:

- Scheduling Queue entries
- Control queue entries
- a Spooler Status queue entry

Queue.index file entries appear in the following format:

QueueName/FileSpecification/EntrySize/QueueType

QueueName is the name you assign to the queue

FileSpecification is the queue's file specification. Enter Scheduling Queue specifications in the following format:

[Sys]<Spl>xxxxx.queue

where xxxxx is the queue name (refer to Scheduling Queue Entries).

Enter Control Queue specifications in the following format:

[Sys]<Spl>xxxxxControl.queue

where xxxxx is the printer name (refer to Control Queue Entries); enter HP7475A for plotters.

Enter Spooler Status Queue specification in the following format:

[Sys]<Spl>SpoolerStatus.queue

EntrySize is the number of sectors per entry. The Spooler requires an entry size of 1.

QueueType is the type of system queue. Enter the number 1 to specify a Spooler Queue.

Scheduling Queue Entries

The Queue Manager stores print requests in a Scheduling Queue file until a printer becomes available. The Queue.index file must include at least one Scheduling Queue entry for each printer device type (parallel or serial) you connect to the workstation.

The default Queue.index file includes two Scheduling Queue entries:

Spl/[Sys]<Spl>Spl.queue/1/1
(parallel printers)

SplB/[Sys]<Spl>SplB.queue/1/1
(for serial printers)

You can use the default Scheduling Queue entries for all of the printers connected to your system. If you have printers connected to more than one workstation, however, you can reduce the waiting time by creating additional Scheduling Queues.

Each Spooler configuration file specifies the Scheduling Queue for the printers the Spooler controls (refer to Customizing the Spooler configuration file). The Queue Manager references the entries in the system's Spooler configuration files to coordinate Scheduling Queues with printers. For this reason, the names specified in the Spooler configuration files and the Queue.index file must correspond.

If you create new Scheduling Queues, each one must have a different name. For example, if your system includes a master and three cluster workstations (WS1, WS2, and WS3), with printers connected to the master and WS1, you could use the default Scheduling Queues for the entire system.

Alternatively, you could use the defaults for the master and create new queues for WS1. The new queues would require different names, as reflected in the following entries:

WS1Spl/[Sys]<Spl>WS1Spl.queue/1/1
(parallel printer)

WS1SplB/[Sys]<Spl>WS1SplB.queue/1/1
(serial printer)

To create additional Scheduling queues, you add Scheduling Queue entries to the Queue.index file using the Editor or the word processing program.

Control Queue Entries

When you enter a printer control subcommand from the SPOOLER STATUS command, (for example, CANCEL PRINT, HALT PRINTER, RESTART PRINTER), or enter a printer control command from an application program, the system stores printer control entries in Control Queue files. The Spooler checks the Control Queues for entries as it performs print operations.

The Queue.index file must include a Control Queue entry for each printer on your system. The default file includes a two Control Queue entries:

SerialControl/[Sys]<Spl>SerialControl.queue/1/1
(serial printer)

ParallelControl/[Sys]<Spl>ParallelControl.queue/1/1
(parallel printer)

You can use the default Control Queues for one serial and one parallel printer; you must create a Control Queue for each additional printer. To create additional Control Queues, you add Control Queue entries to the Queue.index file using the Editor or the word processing program.

Each Control Queue must have a different name. For example, if your system includes a master and three cluster workstations (WS1, WS2, and WS3), with printers connected to the master and WS1, you could use the default Control Queues for the master, and create new queues for WS1. The new queues would require different names, as reflected in the following entries:

WS1SerialAControl/
[Sys]<Spl>WS1SerialAControl.queue/1/1
(serial printer connected to Channel A)

WS1SerialBControl/
[Sys]<Spl>WS1SerialBControl.queue/1/1
(serial printer connected to Channel B)

WS1ParallelControl
/[Sys]<SplWS1ParallelControl.queue/1/1
(parallel printer)

Spooler Status Queue Entry

The system stores information about its Spoolers (such as the names of the printers under their control, files currently queued for printing) in a file called the Spooler Status Queue. The system references this file while executing the SPOOLER STATUS, command and makes status entries in the various subcommands.

The Queue.index file requires only one Spooler Status Queue entry for the entire system. You can use the default entry without modification.

Serial Printer Channel Entries for the XE Master

To fully customize your print operations on the XE master, you must modify the processor configuration file for the processor connected to your printers. For more information on processor configuration files, refer to section 6.

When a CP or TP is attached to a serial printer, the processor's configuration file must contain a line entry for the RS–232–C channel the printer is connected to. This entry must define:

- if the channel is using sync or async mode
- the line speed to be used
- the parity mode, number of stop bits, and number of character bits being used for data transfer

An RS–232–C channel line entry can also contain other optional parameters.

The printer spooler ignores line speed, parity, stopbits, and charbits parameters in any async RS–232–C entries. They are required by the CP and TP to configure the channel as an asynchronous channel during system boot. Therefore, they must be present; however, the printer spooler reconfigures the channel when it starts to run according to the configuration values the configuration file of the printer attached to the channel supplies.

Operating the Printer Spooler

The following subsections describe how to perform specific tasks using the Printer Spooler (for example, to add a printer, remove a printer, or install a printer spooler on an XE master's CP or TP). To perform these tasks, you must make modifications to the spooler files previously described.

Adding a Printer

When adding a printer to the printer spooler configuration, complete the following:

- Use the mCREATE CONFIGURATION FILE command on an XE master and the CREATE CONFIGURATION FILE on a workstation to create the printer configuration file for the printer.
- Use the BTOS Editor to add an entry for the printer in the Spooler configuration file.
- Use the BTOS Editor to add an entry for the printer's control queue to the queue index file.
- If the printer is to have its own schedule queue, use the Editor to add an entry for that schedule queue to the queue index.
- If adding a serial printer, use Editor or the mBTOS CONFIG utility on an XE master and the BTOS CONFIG utility on a workstation to add the appropriate async entry to the processor's configuration file.

Note: If more than one printer is servicing a schedule queue, a queued print file is sent to the first available printer servicing that queue, regardless of whether you specify a printer in the SPOOLER STATUS command.

For this reason it is recommended that, if the format of the printout is critical, all printers servicing a particular queue be of the same type.

Moving a Printer

When moving a printer within the system (for example, to a different channel, processor, or scheduling queue), complete the following:

- On an XE master, be sure that the CP or TP the printer is connected to is running a printer spooler manager.
- Modify the printer's entry in the Spooler configuration file to reflect the printer's new location and/or scheduling queue.
- If moving a serial printer, use the mBTOS CONFIG utility on an XE master to add the appropriate async entry to the configuration file of the printer's new processor.

  Also, use the mBTOS CONFIG utility on an XE master or the to remove the appropriate async entry from the configuration file of the printer's old processor.

Removing a Printer

When removing a printer from the system, it is necessary to remove only that printer's entry in the Spooler configuration file. It is logical for you to remove the printer's scheduling queue from the Queue.index file, if it is the only printer servicing that queue. You can also remove the printer's control queue from the Queue.index file and delete the printer's configuration file.

Printer Translation Files

The MAKE TRANSLATION FILE utility allows you to translate characters in a document into different characters or printer control sequences as you print a document. It is intended primarily for inserting printer function control (escape) sequences in text. You can use it to translate any character into any other single character, or a single character into a series of characters.

Note: It is possible to use the MAKE TRANSLATION FILE utility for text substitution (for example, substituting the word ONE for the number 1). However, this can interfere with the system's ability to determine when it has reached the line length specified in the printer device configuration file. Therefore, you should not use translation files for text substitution.

You use the BTOS Editor to create a source file that lists the characters you want to translate (refer to your standard software documentation). When the source file is complete, use the MAKE TRANSLATION FILE command to convert the source file into a translation file. You can then specify the translation file when you create or modify the printer device configuration file.

Creating the Source File

To create a source file, you use the Editor. Make an entry for each character you want to translate, using ASCII hexadecimal (hex) codes to represent the characters (refer to the ASCII table in your standard software documentation). Entries should be in the following format:

XX = YY

XX is the ASCII hex code for the character you want to translate.

YY is the ASCII hex code for the translated character.

For example, if you want to translate the pound sign (#) into the printer function control code Select 10 cpi, make the following entry:

23 = 1D

Note: Refer to your printer's documentation for a listing of printer function control codes.

Creating a Translation File

Use the MAKE TRANSLATION FILE command to convert a source file into a translation file.

To execute the MAKE TRANSLATION FILE command, complete the following:

1 Type **Make Translation File** at the Executive command line.

2 Press **RETURN**.

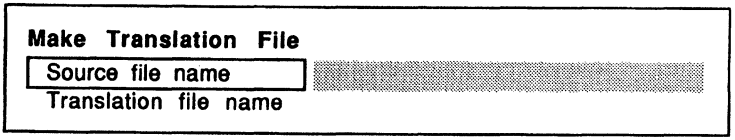
The system displays the command form shown in figure 8–1.

3 Enter a parameter in both fields.

4 Press **GO**.

The system creates the translation file from the source file specified.

Figure 8–1 **MAKE TRANSLATION FILE Command Form**



Field	Action/Explanation
Source file name	Enter the name of the source file you want to convert into a translation file.
Translation file name	Enter the name of the translation file.

Preparing Your Workstation For Printing

To prepare your workstation for printing, you must connect each printer to a workstation and test the interface to ensure that the system communicates with the printer properly.

Connecting the Printers

Each workstation incorporates three communications ports that you can use for connecting printers to your system:

- two RS–232–C ports, labeled Channel A and Channel B, for connecting one or two serial printers
- one Centronics–type port for connecting a parallel printer

Note: For B26, B27, B28, B38, and B39 workstations, the optional Four–Port Communications Expander provides four additional RS–232–C ports.

If you are configuring your system for direct printing, you connect each printer directly to the workstation initiating the print job.

If you are configuring your system for spooled printing, you can connect one or more printers to any workstation in your system, in a variety of configurations:

- a single printer connected to a standalone workstation
- a single printer connected to any workstation (master or cluster) in a cluster system
- two or more printers connected to a standalone workstation

- two or more printers connected to a single workstation (master or cluster) in a cluster system
- two or more workstations in a cluster system with one or more printers connected to each workstation

For information about connecting the printer to your workstation, refer to your printer documentation.

Testing the Interface

You can test the interface between a workstation and a printer by transferring characters directly from the keyboard to the printer without creating a file.

Note: For this test to work, you must configure the printer for direct printing and you should not install the spooler.

If your printer does not correspond to one of the default Device Configuration files, you must create a Device Configuration file (refer to Customizing the Printer Device Configuration Files).

Use the following procedure to test the interface between your workstation and the printer:

1. Type **COPY** at the Executive command line.
2. Press **RETURN**.

   The system displays the COPY command form.
3. Type **[KBD]** in the highlighted **File from** field.

   ([KBD] is the device name for the keyboard.)
4. Press **RETURN**.

   The highlight moves to the **File to** field.
5. Type the printer device name.
   - For a direct parallel printer, enter **[Lpt]**.
   - For a direct serial printer connected to Channel A, enter **[Ptr]A**.
   - For a direct serial printer connected to Channel B, enter **[Ptr]B**.
6. Press **GO**.
7. Type a line or two of text.
8. Press **FINISH**.

   If the workstation and the printer interface correctly, the system prints the text.

9 Using the Editor, create a file containing at least 150 lines of text.

10 Press **FINISH**.

11 Press **GO**.

12 Type **COPY** at the Executive command line.

13 Press **RETURN**.

The system displays the COPY command form.

14 Copy the entire file to the device.

The entire file should print without errors.

Managing Clusters

This section describes managing clusters with workstation BTOS or the XE master BTOS. It describes such cluster management principles as:

- cluster sizes
- channels, status, and polling
- request routing
- cluster management operations
- cluster agent process
- cluster performance considerations
- cluster commands
- assigning identification numbers to cluster workstations
- cluster security
- cluster line speeds
- installable cluster communications system service

Clusters are controlled by the Cluster Management facility, which provides the means of communication (on high–speed RS–422 channels) among cluster workstations and the master to which they are connected. The master can be a master workstation or an XE master.

Cluster Sizes

If you are setting up a cluster, you should consider physical, network, and firmware limitations when determining the size of your cluster.

Physical Limitations

Each BTOS master workstation can support a maximum number of cluster workstations. Standard BTOS software supports the following standard cluster configurations:

B26 Master + 5 cluster workstations
B27 Master + 5 cluster workstations
B28 Master + 11 cluster workstations
B38 Master + 15 cluster workstations
B39 Master + 23 cluster workstations

If you have the BTOS II Customizer, you can generate a master operating system that allows your master workstation to connect more workstations (refer to your system reference documentation). Large, customized cluster configurations put a burden on the master and may result in unacceptable performance or possibly, failure. To avoid this situation, you should conduct a benchmark of your customized cluster configuration. You may require a local hard disk on one cluster station to conduct the benchmark.

When you configure your cluster size to be larger than the standard size Unisys supports, your cluster workstations should have local hard disks. The maximum number for each customized master workstation is:

Note: Unisys supports standard BTOS configurations only. Customized versions of the operating system are not supported.

B26 Master + 15 cluster workstations
B27 Master + 15 cluster workstations
B28 Master + 63 cluster workstations
B38 Master + 63 cluster workstations
B39 Master + 63 cluster workstations

Note: Depending upon the size of your customized configuration, there may be a noticeable performance degradation over the standard cluster configuration sizes.

If your system has Unisys Telecluster hardware, the limitations are:

B26 Master + 15 cluster workstations
B27 Master + 15 cluster workstations
B28 Master + 63 cluster workstations
B38 Master + 63 cluster workstations
B39 Master + 63 cluster workstations

Network Limitations

Because of RS–422 network limitations, RS–485 network limitations, and Telecluster hardware options when using these networks, the maximum number of cluster stations you configure with your master workstation can vary.

If you are configuring a cluster for workstations with RS–422 hardware, the limitations for your cluster are:

B26 Master + 15 cluster workstations
B27 Master + 15 cluster workstations
B28 Master + 15 cluster workstations
B38 Master + 15 cluster workstations

Note: BTOS B26 EXP, B27 CLS, B28 MCP, and B38 MCP workstations are equipped with RS–422 hardware.

If you are configuring a cluster for workstations with RS–485 hardware, the limitations for your cluster are:

B28 EV Master + 31 cluster workstations
B38 EV Master + 31 cluster workstations
B28 EXP Master + 31 cluster workstations
B38 EXP Master + 31 cluster workstations
B39 Master + 31 cluster workstations

If you are configuring a cluster for workstations with RS–485 hardware and your network has B26, B27, B28, or B38 workstations, the limitation for your cluster is:

B39 Master + 15 cluster workstations

Note: BTOS B28 and B38 EV workstations, B28 and B38 EXP workstations, and B28 LCW workstations are equipped with RS–485 hardware.

If you use the Telecluster hardware option, the Telecluster adaptor eliminates the limitations on clusters with RS–422 or RS–485 networks. The maximum number on each Telecluster adaptor is four; therefore, workstation limitations depend upon your Telecluster hub. Because of software limitations, your cluster size is limited to a maximum of 64 workstations in the network. For example,

12–channel Telecluster hub = 48 workstations
24–channel Telecluster hub = 63 workstations

Firmware Limitations

Your cluster can have limitations depending upon the level of firmware (FW) and the type of CPU in your cluster workstations.

To check the level of FW on a B26, B27, B28, or B38 workstation, you power on or reset the system while holding down the spacebar. The level of FW for your workstation is displayed above the Boot Menu. To check the type of CPU, you refer to your BTOS hardware installation documentation.

If you use RS-422 network hardware, regardless of the level of firmware, you follow the limitations described in Network Limitations.

Firmware limitations for cluster workstations are:

B26 CPU with 8.4 FW	= 15 cluster stations maximum
B27 CPU with 1.2 FW	= 15 cluster stations maximum
B27 CLS with 1.2 FW	= 15 cluster stations maximum
B27 LCW with 1.0 FW	= 63 cluster stations maximum
B26 CPU with 9.2 FW	= 31 cluster stations maximum
B26 EXP with 1.0 FW	= 31 cluster stations maximum
B28 CPU with 1.3 FW	= 31 cluster stations maximum
B38 CPU with 1.9 FW	= 31 cluster stations maximum
B38 CPU with 2.9 FW	= 31 cluster stations maximum

Because of the these limitations, if you want to configure a network with B26 or B27 workstations, but you want more cluster stations than the maximum of 15, you add one to the number of desired cluster stations. That is, if you want 20 cluster stations, you configure the network for 21 cluster stations.

If you want to configure your network with B28 and B38 workstations, but you want more cluster stations than the maximum of 31, you add one to the number of desired workstations; for example, if you want 38 cluster stations, configure the cluster for 39 stations.

Channels

One RS–422 channel is standard on each workstation. This channel is used by the master and all workstations for intercluster communication. For large clusters with an XE master, multiple RS–422 channels are provided.

On each XE master, each cluster processor's RS–422 channel is called a line and is numbered. A standard cluster (a cluster configuration attached to a master workstation) has one line, number 0. XE clusters have two lines for each CommIOP board installed. The first board has lines 1 and 2; the second has lines 3 and 4. There is no line 0 in an XE cluster.

The XE master RS–422 channel operates at either 307K or 1.8 megabytes. The workstation master operates at either 307K or 1.8 megabytes, but has a default setting of 1.8 megabytes. You configure the channel by entering the either 307Kbps or 1.8Mbps at the **:ClusterLineSpeed**: parameter in the Config.Sys file (refer to section 3).

Status

The master keeps statistics about errors and normal operational parameters. The GetClusterStatus operation makes these statistics available to any program at any workstation.

You use GetClusterStatus instead of GetWsUserName to obtain information about user statistics (refer to Cluster Management Operations).

Polling

The master uses a technique called polling to check workstations that want to use the RS–422 line for intercluster communications.

On B28/B38/B39 master workstations, polling starts every 1/20 of a second (one poll cycle) when a timer interrupt goes off, or whenever a response is ready to be returned to the workstation that initiated the request.

This polling method polls active workstations more often than those not active. It also guarantees that a workstation will be polled at least once every 1/20 of a second when the cluster is not busy.

On B26/B27 master workstations, polling starts every 1/10 of a second (one poll cycle) or whenever a response is ready to be returned to the workstation that initiated a request.

The master sends a message to each workstation that is currently on line. If a workstation has a request to send to the master, it sends the message at this time; otherwise, it informs the master that it has nothing to send. The master notes which workstations had data to send during roll call.

Repolling

When the master gets to the end of the list of workstations it is polling, it checks the time left in the poll cycle. If time remains, the master again polls each workstation that was active. Repoll is repeated until a new poll cycle starts or until no workstations were active in the last poll. Polling is totally transparent to you.

Request Routing Across the Cluster

Request routing depends upon how your request is defined and where your system services are installed. For further information, refer to your operating system reference documentation. You follow the conventions for routing requests described in that manual to successfully route your requests across the cluster.

To have a request served locally, you must install the system service at your workstation, or status code 33 (Service not available) is returned.

A request such as Read or Write to a file server in a cluster uses the interprocess communication (IPC) request/response model. The same requests are used throughout the cluster. (Note that they differ only in the way routing is defined for them.) For this reason, there are no explicit operations in this section for communication over the cluster.

Cluster Management Operations

Cluster management provides the following operations. (Refer to your system procedural interface documentation for a complete description of each operation.)

Note: The GetWsUserName operation is not supported on the XE master, or on workstations attached to an XE master. GetClusterStatus should be used instead.

DisableCluster allows an application system on the master workstation to disable polling of the cluster workstations after a specified time period. DisableCluster is also used to resume polling of the cluster workstations.

DisableCluster allows an application program on an XE master to disable polling of all cluster workstations (except those on the line specified to stay up) after a specified time period. DisableCluster also is used to resume polling of cluster workstations on the XE master.

GetClusterID obtains the ID and the configuration of a cluster workstation that requests service of the master. It returns a 32–byte structure each time it is called. The structure contains the Hardware ID and configuration information on the cluster requesting services.

GetClusterStatus returns usage statistics for each communications channel and the workstations attached to it.

GetWSUserName returns the user name that is signed on at the specified cluster workstation.

SetWSUserName stores the user signon name of the workstation.

Master Agent Process

BTOS II clusters contain two versions of the operating system (one for the master workstation and one for the cluster workstations). The master workstation version contains a process known as the Master Agent, and the BTOS cluster workstation version contains the Workstation Agent process.

The Master Agent process communicates with the cluster workstations and issues requests on their behalf to the processes on the master workstation. The Workstation process routes requests to the master workstation.

The Agent maintains two lists of cluster workstations.

- Responsive workstations are those from which the Agent is receiving proper responses to polls.
- Unresponsive workstations are those that have not been responding to Agent polls.

Every 100 milliseconds, the Agent begins a polling cycle, during which it polls all responsive workstations. If the polling cycle has not expired, an unresponsive workstation is polled. The Agent polls at least one unresponsive workstation every half second. Responses returning to cluster workstations have priority over polling messages and are sent as soon as possible.

Workstation Bootstrap

The master workstation is bootstrapped as a standalone. A cluster workstation without local mass storage loads from the master workstation. Each type of cluster workstation has a unique run file.

You can bootstrap cluster workstations with local mass storage exactly as a standalone if you insert a diskette containing a valid system image in drive 0, or if a valid system image is present on a hard disk.

Crash Dump capability is also included for cluster workstations. If the file, [Sys]<Sys>WS>CrashDump.Sys, is present, cluster workstations perform a crashdump after a system crash. Also, if you use the Debugger from a cluster workstation, you need the file.

Cluster Performance Considerations

Cluster performance depends heavily on the following parameters, which you configure at System Build:

- Number of Sectors per Transmission Buffer
- Number of Transmission Buffers and Request Control Blocks

Sectors Per Transmission Buffer

The number of sectors assigned to each transmission buffer significantly affects both system performance and the amount of master workstation memory available for application systems.

Since the Workstation Agent splits mass storage requests larger than a single buffer into multiple requests, this parameter limits the maximum size request that can be performed (from a cluster workstation) in a single disk revolution. BTOS uses a value of five sectors per transmission buffer. If your applications require a significant number of large disk transfers and you desire improved system performance, you should use a higher value; if your applications require mostly small disk transfers or if you need more memory, you should use a lower value.

For the cluster workstation, this parameter affects only the size of the DMA buffer and the maximum request size for that particular workstation. Another cluster workstation can have a BTOS with a different Sysgen parameter size for the number of sectors in the Transmission Buffer. The master workstation must have a Transmission Buffer at least as large as that of any cluster workstation.

Transmission Buffers and Request Control Blocks

The number of transmission buffers and request control blocks limits the total number of requests in progress at the master workstation at one time. For applications doing only synchronous I/O, one buffer per workstation is sufficient. For maximum performance in applications doing asynchronous I/O operations, this parameter value should

equal the maximum number of outstanding requests multiplied by the number of workstations; however, you may have to determine an optimal compromise for the application's memory requirements.

BTOS uses a value of 12 transmission buffers for B26 and B27 workstations, and 24 for B28, B38, and B39 workstations. In the cluster workstation, this parameter specifies the number of request control blocks.

Cluster Commands

There are three cluster commands of importance to cluster management:

- The DISABLE CLUSTER command allows you to temporarily suspend cluster activities (for example, when you install software on the master).
- The RESUME CLUSTER command allows you to resume cluster activities after a temporary suspension.
- The CLUSTER STATUS command allows you to monitor the activities of each workstation in a cluster.

DISABLE CLUSTER Command

Occasionally, you may find necessary to temporarily suspend cluster activities. For example, many applications require you to disable the cluster when you install the software at the master.

When you enter the DISABLE CLUSTER command from the master workstation, BTOS at the master stops communicating with the cluster workstations and closes all currently open files.

Caution: While the cluster is disabled, users should not make requests to the media hard disk. Loss of data may occur.

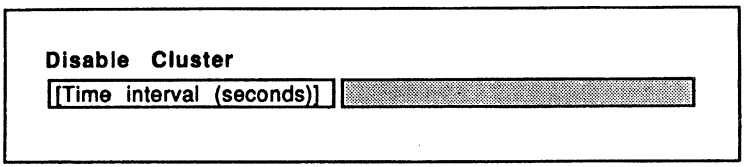
If you enter a request for a file or a system service while cluster activities are suspended, the master returns Status Code 6 and the message, **Master workstation not running**.

You enter the RESUME CLUSTER command to restore communications between the master and cluster workstations (refer to RESUME CLUSTER Command).

To activate the command, you type **DISABLE CLUSTER** at the Executive command line.

- To disable the cluster immediately, you press **GO**.
- To specify a period of time you want the system to wait before disabling the cluster, you press **RETURN**. The system displays the DISABLE CLUSTER command form (refer to figure 9–1).

Figure 9–1 **DISABLE CLUSTER Command Form**



The DISABLE CLUSTER command form includes one optional field, **[Time interval (seconds)]**. If you want the system to wait before disabling the cluster, specify the length of the delay in seconds. The default is 0.

After you complete the command form, you press **GO**.

RESUME CLUSTER Command

When you are ready to restore the cluster, you type the RESUME CLUSTER command at the master workstation; then press **GO**. There is no command form. BTOS at the master workstation resumes communications with the cluster workstations.

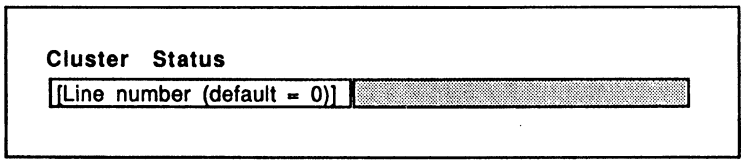
Note: The system does not reopen files that it closes when you disable the cluster.

CLUSTER STATUS Command

The CLUSTER STATUS command allows you to monitor the status of the cluster and the activity of the workstations connected to the master on a specific communications line.

To activate the CLUSTER STATUS command, you type **CLUSTER STATUS** at the Executive command line and press **RETURN**. The system displays the CLUSTER STATUS command form (refer to figure 9–2).

Figure 9–2 **CLUSTER STATUS Command Form**



The CLUSTER STATUS command form has one optional field **[Line number (default = 0)]**. You can leave this field blank to accept status information for the standard channel communications line, or enter another number to override the default and display status information for another channel. Line numbers are given in table 9–1.

Table 9–1 **Cluster Communications Lines**

Line Number	Communications Line
0	Standard Channel
1–4	Reserved for XE master

Cluster Status Display

When you complete the CLUSTER STATUS command form, press **GO** to activate the command. The system displays the Cluster Status Display information according to your specifications (refer to figures 9–3 and 9–4). The display remains on the screen and the system updates the information continuously until you press **FINISH**.

To specify a different communications line, or to instruct the system not to update the Cluster Status display, you press **RETURN**. The system displays the CLUSTER STATUS command form (refer to figure 9–2).

The Cluster Status Display is divided into three parts:

- the heading
- the data displayed for each workstation in the cluster
- the function key menu (protected mode systems only)

Figure 9–3 **Real Mode Cluster Status Display**

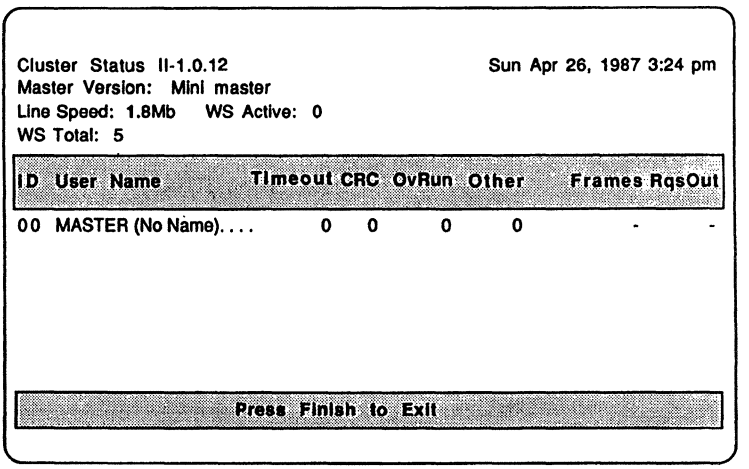
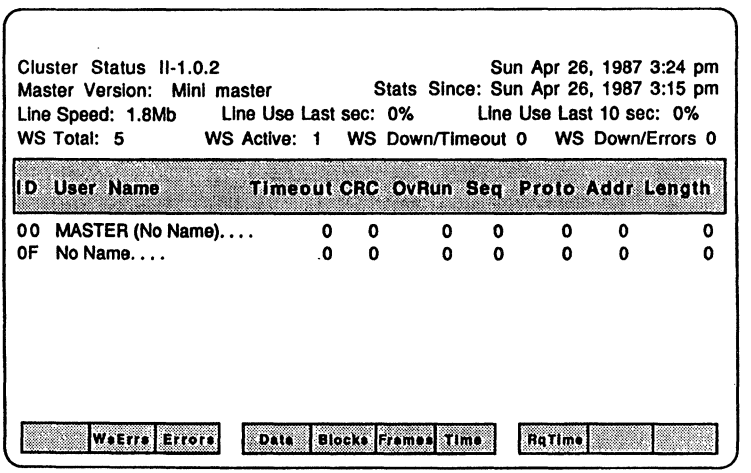

Cluster Status II-1.0.12
Sun Apr 26, 1987 3:24 pm
Master Version: Mini master
Line Speed: 1.8Mb WS Active: 0
WS Total: 5
ID User Name Timeout CRC OvRun Other Frames RqsOut
00 MASTER (No Name).... 0 0 0 0 - -
Press Finish to Exit

Figure 9–4 **Protected Mode Cluster Status Display**


Cluster Status II-1.0.2
Sun Apr 26, 1987 3:24 pm
Master Version: Mini master
Stats Since: Sun Apr 26, 1987 3:15 pm
Line Speed: 1.8Mb Line Use Last sec: 0%
Line Use Last 10 sec: 0%
WS Total: 5 WS Active: 1 WS Down/Timeout 0 WS Down/Errors 0
ID User Name Timeout CRC OvRun Seq Proto Addr Length
00 MASTER (No Name).... 0 0 0 0 0 0 0
0F No Name.... 0 0 0 0 0 0 0
WsErrs Errors
Data Blocks Frames Time
RqTime

Cluster Status Display Heading Information

The display heading provides an overview of the cluster, including the following information:

- the release level of the Cluster Status utility
- the day, date, and time
- the type of master you have
- the start day, date, and time the cluster status display statistics (Protected Mode systems only)
- the line speed of the communications line
- line use percentage in the last one second and last ten seconds (Protected Mode systems only)
- the total number of workstations on the line
- the number of workstations currently active
- the number of workstations that are down because of timeout
- the number of workstations that are down because of errors

Cluster Status Display Workstation Data

The real mode operating system Cluster Status Display, and the Error function level of the protected mode operating system Cluster Status Display show detailed status and error information about each workstation in the cluster. Real Mode systems display information about the cluster line (tallied one count per line), while Protected Mode systems display information about each workstation on the cluster line (tallied one count per workstation):

- ID number
- user name
- the number and types of errors encountered:
- The CRC (cyclic redundancy check) column displays the number of times an error occurs during the transmission of a message from cluster to master (or vice versa).
- The Timeout column allows you to see the number of times a workstation is unable to communicate within the expected amount of time. This is a fairly common error that occurs usually when a workstation is restarting or when the power is off.

- The Overrun column allows you to see if the CPU chip hardware fails to remove characters from the communication chip at an acceptable rate. If your system displays overrun errors, it normally indicates a serious hardware problem. Contact hardware support.
- The Others column, shown on Real Mode displays only, allows you to see if there are electrical problems with the cluster line.
- the sequence, prototype, address, and length of errors (Protected Mode displays only)
- the number of data request frames received by the workstation since the user became active (Real Mode displays only)
- on Real Mode displays only, the number of requests that are queued waiting to be serviced by the system (you can use this information to see if a workstation is active)

Cluster Status Display Function Key Menu

On Protected Mode systems the Cluster Status Display has a function key menu that allows you to display additional status information for a specific cluster communications lines.

You press the WsERRs function key (**f2**) to display error statistics for each workstation as they are sent to the master attached to each GetDateTime request.

You press the ERRORS function key (**f3**) to display total error statistics for all workstations and for each individual workstation attached to the cluster communications line.

You press the DATA function key (**f4**) to display the number of requests processed, sector pages read, and sector pages written for each workstation.

You press the BLOCKS function key (**f5**) to display information about the X blocks, Y blocks, and Z blocks, including the number of each block type allocated, and the number of each block type currently not in use. This information is helpful when you allocate blocks during system configuration.

The X block information is for cluster configurations only. It includes the sizes of X blocks, the number of each usable block type (X blocks that cross a direct memory access

(DMA) boundary are discarded), the number of X block waits (the number of times you could have used an X block had one been available).

Note: The Y block and Z block information is for the XE master only.

You press the FRAMES function key (**f6**) to display how many of each type of frame the master has sent and received. It includes the following:

- Receiver Ready
- Receiver Not Ready
- IFrame Information
- Set Normal Response Mode (SNRM)
- the number of the last SNRM sent

A SNRM announces a station address that is not in use. A station waiting for a station address so that it can come on–line can respond to a SNRM.

You press the TIME function key (**f7**) to display timing statistics, including:

- how many times each workstation has been polled
- the number of milliseconds since the last poll
- the maximum time between polls for each workstation
- average time interval between polls

You press the RqTIME function key (**f8**) to display timing statistics for request processing. For each workstation, the system displays the following information:

- cluster overhead (average and maximum)

  The system derives the cluster overhead statistic by calculating the time it takes to queue a GetDateTime request, send it to the master, and receive the response. Because this request is served directly by the Master Agent, it is a good measure of cluster overhead.
- time to process a simple request (average and maximum)
- time to process a blocked request (average and maximum)

  A blocked request must be broken up into pieces when the size of the data will not fit into one X block. These statistics are calculated by the Workstation Agent and sent to the master attached to each GetDateTime request.

Assigning Identification Numbers to Cluster Workstations

The BTOS Hardware ID service and the optional Cluster Hardware Identification device (for B26, B27, B28, B38, and B39 workstations) allow you to assign a different identification (ID) number to each workstation in a cluster (up to a maximum of 126). This feature is for use with applications and system services that must be able to identify the workstations within a cluster and distinguish them from one another.

On BTOS B26, B28, and B38 workstations, the Hardware ID device is a single chip on the processor board. BTOS B39 workstations do not have a chip; instead, Unisys writes the Hardware ID software to Non-Volatile Memory (NVM). The Hardware ID uses one byte of the eight bytes of memory available.

Note: To use the Hardware ID service feature, you must make sure the B26, B28, or B38 workstation has the optional Hardware Identification device installed and that you select the Hardware ID service from the SIM utility list (refer to section 2). For more information concerning the Cluster Hardware Identification device, contact your Customer Support Representative.

The Hardware ID software includes these services that are built into BTOS:

- WriteHardID
- ReadHardID

The Hardware ID software also supports:

- ID-specific JCL and sign-on processing
- query cluster ID
- cluster connection security

If your cluster workstation is booting up from the master, or your master workstation is booting up, a Sysinit.run program requests the ReadHardID service and selects the JCL and files to process.

Boot Time and SignOn Initialization is for both Real and Protected Mode operating systems.

Query Cluster ID is for Protected Mode operating systems and for Real Mode workstations connected to a Protected Mode master.

Cluster Connection Security is for Protected Mode operating systems and for Real Mode workstations connected to a Protected Mode master.

Setting SysInit.JCL Files with Hardware IDs

If your system has a Hardware ID device, you set a SysInit.Jcl file to [Sys] < Sys > Hwxxx > SysInit.Jcl, where xxx is the workstation Hardware ID. For more information on SysInit.Jcl files, refer to section 4.

If you have not installed the Hardware ID device or if BTOS cannot find the [Sys] < Sys > Hwxxx > SysInit.Jcl file, then you set the initial file to [Sys] < Sys > WSxxx > SysInit.Jcl, where xxx is the workstation type.

Cluster Security

BTOS II provides cluster security by using the Hardware ID feature.

You select the Cluster Security option from the Protected Mode Master menu (refer to section 2). Once selected, the Software Installation Manager (SIM) program copies the following files onto the master system:

- IdTransTable.Txt
- ClstrIDList.txt
- TranslateIdFile.Run

To enable the security, you answer Yes to the **:ClusterIDCheck:** option in the Config.sys file (refer to section 3). The master verifies the cluster connection based on the Hardware ID and the workstation hardware configuration.

When the workstation transits between booting and resource access modes, it enters link initialization protocol. During the protocol exchange, the workstation sends its Hardware ID in an XID frame.

The master verifies that the workstation ID it received is a valid, registered ID and that no workstation currently connected has that ID. Valid workstation information is stored in the Cluster Security File and loaded into the master's memory at boot time from the workstation file, ClstrIDList.bin (refer to Cluster Security File).

Cluster Security File

Each time you add or delete a workstation from a cluster, you update the Cluster Security file by altering the ClstrIDList.txt file on the workstation and rebooting the master to load the new information into the master's memory.

The TranslateIdList.run file translates ClstrIdList.txt into a hexidecimal file containing X–bus/I–bus module IDs rather than Style IDs. The Make Cluster Security command creates this translated file as ClstrIDList.bin.

Cluster hardware ID and X–bus or I–bus module sytle IDs are listed in the cluster file, ClstrIdList.txt. If you enable security by answering Yes to the **:ClusterIDCheck:** option in the Config.sys file (refer to section 3), you make an entry in the ClstrIdList.txt file for each cluster workstation connected to the master. Entries are in the format:

:xxx–SetHwId:xxx
:xxx–MemSize:yyy
:xxx–Xbus#zz:abc
:xxx–Ibus#nn:def

xxx is a Hardware Id value from 1 to 126.

yyy is the number of 32K blocks of memory installed.

zz is an X–bus module position from 1 to 8. You make an entry for each X–bus module.

nn is an I–bus module position from 1 to 5. You make an entry for each I–bus module.

abc is the Style Id of an X–bus module.

def is the Style ID of an I–bus module.

Sample Security File Entry

The following sample of a Cluster Security File entry is for a B28 workstation with 3MB of RAM and a B28 cluster with 2MB of RAM:

```
:003–SetHwId:004
:003–MemSize:96
:003–Xbus#01:b28–CPU
:003–Ibus#01:b25–d1
:007–SetHwId:007
:007–MemSize:64
:007–XBus#01:b28–CPU
007–XBus#02:b25–M4
:007–IBus#01:b25–d1
:007–IBus#02:b25–k5
```

The first line indicates the hardware ID (004). The second line indicates the 3MB of RAM (96). The third line indicates the B28 CPU (b28–CPU). The unit has one X–Bus device; the B28 CPU is X–Bus device #01.

You make a video entry even though your unit may not have a monitor. You enter an identifier that indicates either monochrome or color monitor and that is based on your video controller. In the example, the fourth line indicates a monochrome monitor controller (B25–d1). A typical color monitor identifier is B25–CD3.

Device 007 is a B28 workstation with 2MB of RAM, a D1 screen and a K5 keyboard.

The system compiles only those lines that begin with a colon (:). In the example, the system ignores the 007–XBus#02:b25–M4 disk drive entry.

Cluster Line Speed

All B26, B27, B28, B38, and B39 master workstations must operate at a cluster line speed of 307Kbps or 1.8 Mbps. You configure the speed by entering either 307Kbps or 1.8Mbps at the **:ClusterLineSpeed:** option in the Config.Sys file. (Refer to section 3.) The default cluster line speed in 1.8 Mbps.

Installable Cluster Communications System Service

BTOS II 3.0 Protected Mode master operating systems have a separate cluster communications run file that BTOS loads when the master boots up. The run file, ClusterService.Run, is in the master workstation's [!sys] < sys > directory and allows the master to communicate with cluster workstations. Without the file, the master would perform like a standalone workstation.

The Installable Cluster Utility is part of the Cluster Utility Package. BTOS automatically installs the ClusterService.Run file when you install the cluster utilities.

Rebooting the Cluster When the Master Reboots

To reboot a cluster workstation when the master reboots, you specify which cluster workstation needs rebooting in the **:RebootClusterOnMasterDown:** parameter in the Config.sys file (refer to section 3).

You specify the hardware ID of the cluster workstation that you want rebooted when the master reboots. You repeat the parameter for each cluster workstation.

Appendix A

Troubleshooting

This appendix provides a guideline for troubleshooting problems that can arise during installation and configuration of the software. It describes typical hardware and software problems and provides simple procedures to rectify the problems.

Handling Workstation Installation Problems

If you have trouble starting up your workstation or installing the software, it is usually a simple matter to isolate and fix the problem.

You begin by tracing your steps back through the installation process to make sure you performed each step correctly. Verify that you have the correct floppy disks for BTOS by comparing the number on the disks to the numbers presented in section 1.

There are two additional items that can help you isolate a problem:

- status codes
- diagnostic programs

Status codes are numbers that display when an error occurs. Your status codes reference documentation lists each status code and its assigned message. The messages describe the possible causes of the error and, when applicable, explain how to fix the problem.

Diagnostic programs are software that contain tests that check each component of your workstation. These tests pinpoint hardware problems, for example, corrupted chips on the monitor controller or malfunctioning disk drive heads. Refer to your Modular Diagnostic documentation.

The following subsections describe some possible problems and their solutions.

Bootup Problems

As part of the bootup process, a workstation runs through a self–test. If an error message appears, refer to your status codes documentation.

If your system does not power up, check to see if your workstation is plugged in and if your screen and keyboard are connected. If the connections are secure, look for loose wiring or other visible signs of damage on the cables.

If you are installing operating system software and your workstation does not boot up when you turn it on, verify that you have the correct floppy disks (refer to table 1–4). If you have the correct floppy disks for your workstation, look for damage to the disks.

Also, verify that you are inserting the floppy disk into the disk drive correctly. Floppy disk installation may vary from workstation to workstation; verify that you are inserting the floppy disk correctly for your workstation and that you are operating the drive latches correctly. Refer to your BTOS hardware installation documentation.

If your system is attached to a cluster, go to the master and enter the Executive. Enter the CLUSTER STATUS command and check to see if your master recognizes the cluster workstation. If not, check the cluster cabling. If the cabling is not the problem, reboot the master.

If your system still does not work after you reboot the master, try rebooting your workstation by turning the power on and off.

Screen Problems

If your system is plugged in and your CPU light is on, but your screen is dark, check the screen cable connection. Also check the brightness control.

If images flicker or wave, check the cable connection.

If the screen suddenly goes blank, there may be no problem. You press any key. If the screen display reappears, it means that your system is set up to time out (turn the display off) when you do not use it for a specific period of time. You will not lose any data when this happens.

Handling XE Master Installation Problems

If you have problems starting up or installing software on the XE master, you isolate the problem by tracing your steps back through the installation process. If necessary, repeat the installation process up to the point of failure.

Refer to section 5 to verify that you have the correct tapes for your XE master.

Check the cabling between the XE master and the workstations. Look for loose wiring or other visible signs of damage.

Verify that the keyswitch on the XE master is in the correct position (refer to section 5).

Tape Problems

Verify that the write–protect cam is in the correct position on the tapes and that you retension the tapes (refer to section 5).

Also, look for visible signs of damage on the cartridge.

Note: The cartridge may be damaged, but may not show visible signs of damage (for example, it could have been exposed to excessive shock or magnetic fields, such as power sources or the CRT).

Read the installation instructions in section 5 to verify that you are inserting the tapes correctly.

If you are getting excessive read/write errors, try retensioning the tape. Also check to make sure the drive heads are clean; dirty heads are the most frequent cause of errors.

If you have a half–inch tape, verify that the tape drive is connected to the first disk processor (DP00), if your system does not have a DP, verify that the tape drive is connected to the first SP (SP00). For information on processor numbering schemes, refer to table A–1 and figure A–1.

Processor Problems

If your tapes and tape drives are operational, but you still encounter problems, verify that processors for your XE master are in the correct position. Table A–1 provides the processor slot numbering scheme for the XE master's processors. Figure A–1 depicts the numbering scheme and board layout within the XE master.

Table A–1 **Processor Slot Numbering Scheme**

Enclosure	P0	P1	P2	P3	P4	P5	P6	P7
Base	70	71	72	73	74	75	76	77
Expansion 1	60	61	62	63	64	65	66	67
Expansion 2	50	51	52	53	54	55	56	57
Expansion 3	40	41	42	43	44	45	46	47
Expansion 4	30	31	32	33	34	35	36	37
Expansion 5	20	21	22	23	24	25	26	27

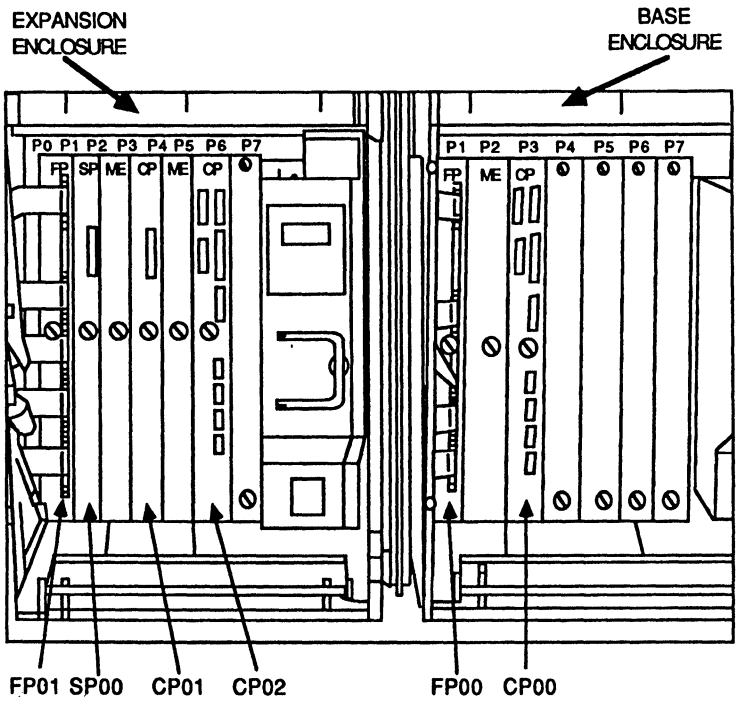
Recording XE Master Disk Bad Spots

To reinitialize your XE master disk, you need a listing of the disk's bad spots.

You use the BAD SPOT REPORT command to list the information about the bad spots on your system disk. In the BAD SPOT REPORT command form, use the **[Print file]** option to copy this information to a printable file. Print the file and save the hardcopy listing and the files of your system disk bad spots in a safe place.

Refer to your XE500 administration documentation for details on BAD SPOT REPORT and bad spot information.

Figure A–1 **Processor Board Numbering Scheme**


EXPANSION ENCLOSURE
BASE ENCLOSURE
P0 P1 P2 P3 P4 P5 P6 P7
FP SP ME CP ME CP
P1 P2 P3 P4 P5 P6 P7
FP ME CP
FP01 SP00 CP01 CP02
FP00 CP00

Listing Disk Bad Spots

When you reinitialize a disk, you enter a listing of known bad spots in the MIVolume command form. Having a file listing of these bad spots makes it easier to enter the bad spots.

Also, if a disk's volume control structure bad spot listing becomes corrupted, a printed copy of the listing is the only record of known bad spots on the disk.

For the procedure to generate a file and printed listing of disk bad spots, refer to your XE500 administration documentation.

Handling Clusters

If you have problems with your cluster connections,

check each cable connection, making sure each cluster workstation is properly attached to the master. Many problems result because of poor electrical connections. Refer to your *BTOS Hardware Network Planning and Installation Guide.*

Cluster performance depends heavily on the following parameters, which you configure at System Build:

- number of sectors per transmission buffer
- number of transmission buffers and request control blocks

Refer to section 9 for more information on these parameters.

You verify that each cluster is recognized by the master by using the CLUSTER STATUS command. The command allows you to monitor the status of the cluster and the activity of the workstations connected to the master on a specific communications line. For information on activating the CLUSTER STATUS command, refer to section 9.

If your workstations cannot establish communication with the master, you check the security of the cluster. Look at the **:ClusterIDCheck:** option in the Config.sys file. If you answered Yes at this option, the security is enabled (refer to section 9). If you do not want security enabled, answer No at this option.

For security to operate properly, you make an entry for each cluster workstation in the cluster file, ClstrIdList.txt. The entries are in the format:

:xxx-SetHwId:xxx
:xxx-MemSize:yyy
:xxx-Xbus#zz:abc
:xxx-Ibus#nn:def

For an explanation of the entries, refer to section 9.

The TranslateIdList.run file translates ClstrIdList.txt into a hexidecimal file containing Xbus/Ibus module Ids rather than Style Ids. The translated file is the file, ClstrIdList.bin.

You verify that ClustrIdlist.bin exists on the master and that it contains the correct information to represent all of the cluster workstations. If you update the ClustrIdlist.bin file, you reboot the master.

Appendix B

Installation Error Messages

When an error occurs during SIM's installation of software, the system creates an error file, [sys]<sys>Install.err. As installation errors occur, an error message will appear in the Dialog Screen (refer to section 2), and the same error is logged in [sys]<sys>Install.err file. You press any key to continue with SIM execution. SIM error messages are as follows:

Error found at line xxx

There is an error in the data file format at the line indicated. SIM enters the incorrect line number in the [sys]<sys>Install.err file. Press any key to continue.

Insufficient disk space exists for xxx Software Package

This message can appear for any software package SIM installs. SIM checks the available disk space before installation begins. Consult your system administrator.

Remove BXXSTx–x and Insert BXXSTx–x

You inserted the wrong floppy disk during installation. Follow the instructions in SIM's Dialog Screen by removing the present floppy disk and inserting the disk indicated.

[xxx]<xxx>file in use

The data file SIM needs is in use. Press any key to continue with SIM execution.

You may receive an error code during installation of the software or configuration of your system. The error codes are displayed by the BTOS CheckErc procedure. If you are using SIM, in most cases, you cannot continue with software installation if this happens. Refer to your Status Code reference documentation to correct the error. Error codes do not remain on the screen and are not appended to the [sys]<sys>Install.err file.

Appendix C

IVOLUME Parameters

Initialization of a hard disk used as a system volume takes place during the software installation procedure (refer to sections 1 and 2). During the initialization process, the system:

- formats the disk or diskette
- identifies surface defects with write/read tests
- writes volume control structures onto the disk or diskette
- creates system files
- resets SCSI default sectors to 512 bytes

The IVOLUME Parameters Screen is shown in figure C–1. You must enter parameters in two IVOLUME fields:

- In the **Device name** field, enter the name of the device that contains the volume you want to format. Typically, for a standard system the names of the floppy disk drives are f0 and f1; the hard disk drives are d0, d1, and d2.
- In the **Volume name** field enter a name (a maximum of 12 characters) to identify the volume. This name must not duplicate any device or active volume name.

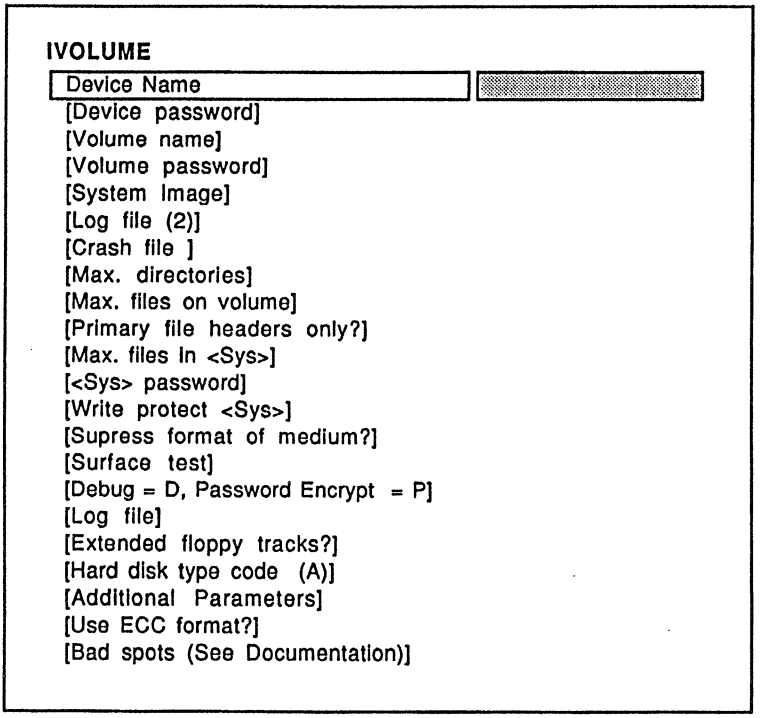
The IVOLUME command form also has 20 optional fields (enclosed in square brackets). The defaults for these fields are set for a nonsystem volume. You can leave any or all the fields blank to accept the defaults or enter parameters to override the defaults. Figure C–1 shows the defaults for the IVOLUME command form. Refer to table C–1 for information about each optional field.

When you complete the IVOLUME command form, you press **GO**. The initialization of the volume begins. You must respond to the prompts that appear during the initialization procedure.

To avoid accidentally erasing a volume that contains data, the system determines if the volume contains a valid Volume Home Block (VHB). If one exists, the volume has been formatted previously.

Upon finding a valid VHB, the IVOLUME utility displays the information contained in it, and requests confirmation of the volume's reinitialization.

Figure C–1 **IVOLUME Command Form Defaults**



Note: The system states the maximum number of files on the volume as a range (for example, 47 to 71). This is an approximation; the actual number depends on the physical arrangement of the files on the volume. Similarly, the system states the maximum number of files on the directory SYS as a range approximating the number of file names on the volume's SYS directory. The actual number depends on the length of the file names and the maximum number of files on the volume.

Table C–1 **IVOLUME Command Optional Fields**

Field	Action/Explanation
[Device password]	The default device password is the same as the device name. A device password is required for all hard disks and user–designated floppy disks. To assign a device password, you must customize the operating system. To customize your workstation operating system, refer to section 3; to customize your XE master operating system, refer to section 6.
[Volume password]	The default leaves the volume unprotected. No password is necessary to access it, and none of its directories or files can have passwords. To assign a password to this volume, enter a maximum of 12 characters. You must use this password when you create files or directories, or when you open files on this volume. You can assign a password to a volume at a later time with the CHANGE VOLUME NAME command. Refer to the [Debug=D, Password Encrypt=P] parameter for information on volume password encryption.
[System Image (default = 0)]	The default allocates 0 sectors for the system image. To initialize a nonsystem disk (for example, an archive diskette or an expansion disk), accept the default. To initialize a system disk with a standard system image, enter 640. To initialize a system disk with a nonstandard system image, you must enter the number of sectors required for the system run file. You can obtain this number by using the FILES command (refer to your standard software operations documentation). When you enter y in the [Details?] field of the FILES command form, the name of the system image file and the size of the run file at system build appear.

Table C–1 **IVOLUME Command Optional Fields** (continued)

Field	Action/Explanation
	For an expanded system, allow enough sectors to support another BTOS run file. You cannot expand the number of sectors later without reinitializing the disk. IVOLUME creates the file [Sys]<Sys>SysImage.sys with the specified number of sectors, but does not copy the system image to it. You use the COPY or RESTORE command to perform this function. You cannot copy the SysImage.sys file to an initialized volume without using IVOLUME to allocate space to it. If the area for SysImage.sys is smaller than the SysImage.sys file being copied, the system displays an error message. You must reinitialize the disk to recover.
[Log file (default = 0)]	The default directs the system to allocate 0 sectors for the log file. The system writes log entries to the system disk only. If this volume does not contain a system image, accept the default. To specify the size of the log file, enter the number of sectors to allocate for it (two is recommended). If the log file overwrites existing entries before it is convenient to print, enter a larger number in this field.

Table C–1 **IVOLUME Command Optional Fields** (continued)

Field	Action/Explanation
[Crash file (default = 0)]	After a system crash, bootstrapping dumps the entire memory contents into a Crash Dump file that you specify. This file helps determine the cause of the crash. You should make an entry in this field if you want to use the system for program development or if you experience hardware or software problems. The default directs the system to allocate two sectors for the Crash Dump file; thus, the system does not create a Crash Dump file when BTOS is bootstrapped. To create a Crash Dump file, enter two sectors for each 1 Kb of memory you want to dump.
[Max. directories]	The default directs the system to set the maximum number of directories for this volume, according to the volume size. To specify the maximum number of directories, enter the number.
[Max. files on volume]	To specify the maximum number of files, you enter the number. Allow a sufficient number for future expansion; you cannot increase this number at a later date without reinitializing the volume. BTOS multiplies the number you enter by 1.5. The default sets the maximum number of files for this volume, according to the volume size.
[Primary file headers only?]	The default (no) directs the system to allocate space for both primary and secondary File Header Blocks. To conserve disk space, enter y to allocate space for a primary File Header Block only. This destroys the secondary file structure, but gains a large amount of disk space.

Table C–1 **IVOLUME Command Optional Fields** (continued)

Field	Action/Explanation
[Max. files in Sys Directory]	The default directs the system to set the maximum number of files in the <Sys> directory, according to the volume size. To specify the maximum number of files, enter the number. Allow for more files than needed; file system performance degrades if the directory exceeds 80 percent capacity. Remember that the system files reside in the <Sys> directory.
[Sys Directory password]	The default leaves the files in the <Sys> directory unprotected; no password is necessary to access it. To assign a password to the <Sys> directory, enter a maximum of 12 characters. A user must enter this password to create a file in this directory. If you specify yes in the [Write protect Sys Directory] parameter, then BTOS assigns <Sys> a protection level of five. This allows users to read files in the directory, but not write files. **Note:** Password protection does not work unless you also specify a volume password.
[Write protect Sys Directory?]	The default is no; the system does not set the protection level of the files in the <Sys> directory to modify protected. To set the default file protection level of the files in the <Sys> directory to modify protected, enter y. You must have specified previously both a volume and a <Sys> directory password.
[Suppress format of medium?]	The default (no) does not reduce the time required to reinitialize a previously formatted volume. You should accept the default if you are initializing a new disk. To reduce the time required to reinitialize a medium that was previously a formatted volume, enter y.

Table C–1 **IVOLUME Command Optional Fields** (continued)

Field	Action/Explanation
[Surface tests]	A surface test writes and reads each sector on the disk to ensure that it is defect–free. It logs any errors and makes an entry for that sector in BadBlk.sys. Surface tests use random data; therefore, the more tests specified, the more reliable the results. You should run surface tests the first time you initialize diskettes. Do not use any diskettes that have surface errors. The default values are one test for diskettes, one for initialized hard disks, and eight for uninitialized hard disks. If you want more tests than the default, enter the number you want. If you enter 0, the system reduces the time required to reinitialize a hard disk or a diskette.
[Debug=D, Password Encrypt=P]	Enter D if you want your system to display debugging information. The default does not allow the system to display debugging information.Enter P if you want to password encrypt your B28. B38, or B39 system. If you enter P in this parameter your volume password is not visible when you do a system structure. **Note:** If you encrypt your volume password, write it down and store it in a safe place; the system will not allow you or other users to see the password in the system structures.
[Log file]	The log file receives a report of the IVOLUME operation. If this file does not exist, the system creates it; if it exists, the system automatically appends the log to it. The default directs the system to display the log only. To receive a printed log of the volume initialization, enter the name of the file that you want to receive this information.

Table C–1 **IVOLUME Command Optional Fields** (continued)

Field	Action/Explanation
[Hard disk type code (default = A]	Enter a code in this field only if you are initializing a B26, B27, B28, B38 or B39 hard disk drive. If you do not know the type code for your hard disk drive or your hard disk drive does not contain a type code, press Help. The system displays Vendor Codes with their corresponding hard disk type codes to assist you in making an entry. **Note:** If you are reinitializing a hard disk drive, no entry is required in this field.
[Use ECC format?]	If the field is left blank, the system uses the existing CRC or ECC format. If the controller supports ECC and there is no previous format information on the disk drive, IVOLUME selects the ECC format. If you enter y, BTOS uses ECC when formatting and writing to the disk. If the controller does not support the ECC capability or if the current operating system is not at least revision 8.0 or greater, you receive an error message. **Note:** If the controller supports ECC, drives larger than 40 Mbs must use ECC. The error message, **Drive this size must be formatted with ECC**, displays when the capacity is greater.
[Bad spots (SeeDoc.)]	**Note:** If your system has SCSI hard disk drives, you do not use this parameter. This field applies to hard disk drives only. Each drive comes with a report of bad spots. Locate and read the media defect report that came with your system. The default indicates that no bad spots exist on the disk.

Table C–1 **IVOLUME Command Optional Fields** (continued)

Field	Action/Explanation
	Caution: IVOLUME performs a surface test to identify bad spots on the medium, but it may not detect marginal spots. Marginal bad spots can fail; thus, they are not appropriate areas in which to store data. Whenever you initialize a new hard disk drive, you must enter the bad spot information for the drive. To reinitialize a hard disk drive, no entry is required in this field. If your media report lists bad spots, use the following instructions: □ Type entries for your report. Insert slashes between the columns and use no spaces within an entry. □ If you have more than one entry, separate each entry with a space. □ One extra field appears below this parameter prompt field to allow space for entering additional bad spot information. □ If the bad spot information does not fit on one line, press RETURN to continue on the next line. Do not divide an entry. □ If you cannot fit all of the bad spot information in the available space, create an "at–file" containing the information and enter @<filename> on this line. □ If the format operation fails, bad spot information is saved on the scratch volume before reformatting the disk. To recover the bad spot information, you enter the scratch disk file name. Enter [scr]<$>IVBadSpots_xx.tmp (xx is the disk being formatted; for example, f0, d0). The system creates this file only if the format operation failed on an earlier attempt to format the same disk.

Appendix D

XE Master Default System Configuration Files

mBTOS CONFIG General Default Initialization Files

[sys]<cmd>DefInitFb00.jcl (Master FP Systems with QIC Tape)
$continueonerror
$run [!sys]<sys>InstallQMgr.run
$run [!sys]<admin>MfAdminAgent.run

[sys]<cmd>DefInitCb00.jcl
$run [!sys]<admin>mSpoolerMgr.run

[sys]<cmd>DefInitDb00e.jcl (Master DP Systems with Half-Inch Tape)
$continueonerror
$run [!sys]<sys>InstallQMgr.run
$run [!sys]<admin>mTapeServer.run,2,16
$run [!sys]<admin>MfAdminAgent.run

[sys]<cmd>DefInitDb00f.jcl (Master DP Systems with QIC Tape)
$continueonerror
$run [!sys]<sys>InstallQMgr.run
$run [!sys]<admin>mQicServer.run,85
$run [!sys]<admin>MfAdminAgent.run

[sys]<cmd>DefInitDb00.jcl (Master FP Systems)
$run [!sys]<admin>mTapeServer.run,2,16

[sys]<cmd>DefInitSb00.jcl
$run [!sys]<admin>mTapeServer.run,2,16

[sys]<cmd>DefInitTb00.jcl
[This file is empty.]

mBTOS CONFIG General Default Configuration Files

[sys]<cmd>DefFb00.cnf (Master FP Systems)

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK=0   DEVICE=d0,    PASSWORD=d0
DISK=1   DEVICE=d1,    PASSWORD=d1
DISK=2   DEVICE=d2,    PASSWORD=d2
DISK=3   DEVICE=d3,    PASSWORD=d3
DEBUGGER
```

[sys]<cmd>DefFb01.cnf (Master FP Systems)

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK=0   DEVICE=d4,    PASSWORD=d4
DISK=1   DEVICE=d5,    PASSWORD=d5
DISK=2   DEVICE=d6,    PASSWORD=d6
DISK=3   DEVICE=d7,    PASSWORD=d7
DEBUGGER
```

[sys]<cmd>DefFb02.cnf (Master FP Systems)

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK=0   DEVICE=d8,    PASSWORD=d8
DISK=1   DEVICE=d9,    PASSWORD=d9
DISK=2   DEVICE=d10,   PASSWORD=d10
DISK=3   DEVICE=d11,   PASSWORD=d11
DEBUGGER
```

[sys]<cmd>DefFb03.cnf (Master FP Systems)

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK=0   DEVICE=d12,   PASSWORD=d12
DISK=1   DEVICE=d13,   PASSWORD=d13
DISK=2   DEVICE=d14,   PASSWORD=d14
DISK=3   DEVICE=d15,   PASSWORD=d15
DEBUGGER
```

[sys]<cmd>DefDb00.cnf

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK 0   DEVICE=s0,    PASSWORD=s0
DISK 1   DEVICE=s1,    PASSWORD=s1
DISK 2   DEVICE=s2,    PASSWORD=s2
DISK 3   DEVICE=s3,    PASSWORD=s3
DISK 4   DEVICE=s4,    PASSWORD=s4
DISK 5   DEVICE=s5,    PASSWORD=s5
DEBUGGER
```

[sys]<cmd>DefDb01.cnf

```
BlockType=y, Number=23
BlockType=z, Number=95
DISK 0   DEVICE=s6,    PASSWORD=s6
DISK 1   DEVICE=s7,    PASSWORD=s7
DISK 2   DEVICE=s8,    PASSWORD=s8
DISK 3   DEVICE=s9,    PASSWORD=s9
DISK 4   DEVICE=s10,   PASSWORD=s10
DISK 5   DEVICE=s11,   PASSWORD=s11
DEBUGGER
```

[sys]<cmd>DefCb00.cnf

```
BlockType=x, Number=24
BlockType=y, Number= 5
BlockType=z, Number=10
async  3, speed=9600, parity=none, stopbits=1, charbits=8
line1, clock=2M
line2, clock=2M
DEBUGGER
```

[sys]<cmd>DefSb00.cnf

```
BlockType=y, Number= 4
BlockType=z. Number=30
DEBUGGER
```

[sys]<cmd>DefTb00.cnf

```
BlockType=y, Number=4
BlockType=z, Number=30
async  5, speed=9600, parity=none, stopbits=1, charbits=8
async  6, speed=9600, parity=none, stopbits=1, charbits=8
async  7, speed=9600, parity=none, stopbits=1, charbits=8
async  8, speed=9600, parity=none, stopbits=1, charbits=8
async  9, speed=9600, parity=none, stopbits=1, charbits=8
async 10, speed=9600, parity=none, stopbits=1, charbits=8
DEBUGGER
```

Restricted Mode System Configuration Files

[sys]<sys>master.r.cnf (Master FP Systems)

```
WatchDog=None
CP              [sys]<sys>CpBtos.r.sys
Include         [sys]<sys>Cp00.r.cnf
Dp              [sys]<sys>DpBtos.r.sys
Include         [sys]<sys>Dp00.r.cnf
Sp              [sys]<sys>SpBtos.r.sys
Tp              [sys]<sys>TpBtos.r.sys
Include         [sys]<sys>Tp00.r.cnf
End
```

[sys]<sys>master.r.cnf (Master DP Systems)

```
WatchDog=None
Cp              [sys]<sys>CpBtos.r.sys
Include         [sys]<sys>Cp00.r.cnf
Fp              [sys]<sys>FpBtos.r.sys
Include         [sys]<sys>Fp00.r.cnf
Sp              [sys]<sys>SpBtos.r.sys
Tp              [sys]<sys>TpBtos.r.sys
Include         [sys]<sys>Tp00.r.cnf
End
```

[sys]<sys>InitFp00.r.jcl (Master FP Systems with QIC Tape)

```
$continueonerror
;
$run [sys]<sys>CreatePartition.run,100K,QIC
$run [sys]<admin>mInstallServer.run,QIC,
      [sys]<Admin>mQicServer.run
;
$end
```

[sys]<sys>InitDp00.r.jcl (Master DP Systems with QIC Tape)

```
$continueonerror
$run [sys]<sys>CreatePartition.run,100k,QIC
$run [sys]<admin>mInstallServer.run,QIC,
     [sys]<admin>mQICServer.run
;
$end
```

[sys]<sys>InitDp00.r.jcl (Master DP Systems with 1/2" Tape)

```
$continueonerror
$run [sys]<sys>CreatePartition.run,180k,HIT
$run [sys]<admin>mInstallServer.run,HIT,
     [sys]<admin>mTapeServer.run
;
;
$end
```

[sys]<sys>InitCp00.r.jcl (All Systems)

```
$continueonerror
;
$run [sys]<admin>MfAdminAgent.run;
;
$end
```

[sys]<sys>InitSp00.r.jcl (All Systems)

```
$continueonerror
;
;
$end
```

[sys]<sys>InitTp00.r.jcl (All Systems)

```
$continueonerror
;
;
$end
```

[sys]<sys>Fp00.r.cnf (Master FP Systems)

```
BlockType=y, Number=18
BlockType=z, Number=40
DISK=0   DEVICE=d0,   PASSWORD=d0
DISK=1   DEVICE=d1,   PASSWORD=d1
DISK=2   DEVICE=d2,   PASSWORD=d2
DISK=3   DEVICE=d3,   PASSWORD=d3
```

[sys]<sys>Dp00.r.cnf (Master DP Systems)

```
BlockType=y, Number=18
BlockType=z, Number=40
DISK 0    DEVICE=s0,   PASSWORD=s0
DISK 1    DEVICE=s1,   PASSWORD=s1
DISK 2    DEVICE=s2,   PASSWORD=s2
DISK 3    DEVICE=s3,   PASSWORD=s3
DISK 4    DEVICE=s4,   PASSWORD=s4
DISK 5    DEVICE=s5,   PASSWORD=s5
```

[sys]<sys>Cp00.r.cnf
Block Type = x, Number = 16
Block Type = y, Number = 6
Block Type = z, Number = 60
async 3, speed=9600, parity=none, stopbits=1, charbits=8
line1, clock=2M
line2, clock=2M

[sys]<sys>Sp00.r.cnf
Block Type = y, Number = 4
Block Type = z, Number = 30

Printer Spooler Configuration Files

[sys]<sys>Queue.index
SPL/[sys]<spl>SPL.queue/1/1
SPLB/[sys]<spl>SPLB.queue/1/1
SPOOLERSTATUS/[sys]<spl>SPOOLERSTATUS.QUEUE/1/1
PARALLELcontrol/[sys]<spl>ParallelControl.queue/1/1
SERIALcontrol/[sys]<spl>SerialControl.queue/1/1

[sys]<sys>SplCnfg.sys
0/PARALLEL/SPL/[sys]<sys>SPLconfigCp00.sys/64/y/Cp00
B/SERIAL/SPLB/[sys]<sys>SPLCconfigCp00.sys/64/y/Cp00

Unisys Supported Disk Device Configuration Files

[sys]<sys>IvAtasi46.cnf:
; THIS IS FOR AN Atasi 46 Mb DRIVE
CYLINDERS=645
TRACKS=7
SECTORS=16
BYTES=512
STEP=0
SEEK=110
SETTLE=0
REMOVABLE=no
END

[sys]<sys>IvHitachi51.cnf:

```
; THIS IS FOR A Hitachi 51 Mb DRIVE
CYLINDERS=699
TRACKS=7
SECTORS=16
BYTES=512
STEP=0
SEEK=110
SETTLE=0
REMOVABLE=no
```

[sys]<sys>IvHitachi85.cnf:

```
; THIS IS FOR A Hitachi 85 Mb DRIVE
CYLINDERS=823
TRACKS=10
SECTORS=16
BYTES=512
STEP=0
REMOVABLE=no
END
```

[sys]<sys>IVMicropolis52.cnf:

```
; THIS IS FOR A Micropolis 52 Mb DRIVE
CYLINDERS=753
TRACKS=6
SECTORS=16
BYTES=512
STEP=0
SEEK=110
SETTLE=0
REMOVABLE=no
END
```

[sys]<sys>IVMicropolis85.cnf:

```
; THIS IS FOR A Micropolis 85 Mb DRIVE
CYLINDERS=1024
TRACKS=8
SECTORS=17
BYTES=512
STEP=0
REMOVABLE=no
END
```

[sys]<sys>IVToshiba85.cnf:

```
; THIS IS FOR A Toshiba 85 Mb DRIVE
CYLINDERS=830
TRACKS=10
SECTORS=17
BYTES=512
STEP=0
REMOVABLE=no
END
```

[sys]<sys>IVMemorex166.cnf:

```
; THIS IS FOR A Memorex 166 Mb DRIVE
CYLINDERS=823
TRACKS=10
SECTORS=32
REMOVABLE=no
END
```

Glossary

AdminAgent. AdminAgent is the system service that manages the execution of the master utilities on XE master processors. The AdminAgent can run in either single mode or multiple mode.

application partition. An application partition is a section of user memory reserved for the execution of an application.

application system. An application system is the collection of all tasks currently loaded in an application partition.

archive. The archive procedure is used to backup system files onto floppy diskettes.

archive file. An archive file is a data set consisting of floppy diskettes with the same volume name and numeric suffixes. The system uses archive files with the BACKUP VOLUME, SELECTIVE BACKUP, and RESTORE commands only.

archive volume. An archive volume is a floppy diskette that is used to archive (back up) files.

ASCII (American National Standard Code for Information Interchange). ASCII is a control and graphic character set consisting of 7–bit coded characters (8 bits including parity check), used for information interchange between data communications systems.

background process. A background process runs with no interaction with the user through the terminal.

backup. See archive.

bad spot. A bad spot is any part of a hard disk that is faulty and cannot record information.

Batch utility. A batch utility provides a job stream capability and allows programs to run in a processor's secondary partitions while a user–interactive program runs in a primary partition.

block. A block is a 512–byte subdivision on the disk. A block is also referred to as a sector.

bootup. Bootup is the operation that starts up the system when the keyswitch on the XE master base enclosure is turned from STOP to MANUAL, REMOTE, or NORMAL. The bootup operation includes running a series of self–diagnostic tests, loading the master operating system, and reading the set of system files associated with the position to which the keyswitch is turned.

BTOS. BTOS is the Unisys workstation operating system. All XE master boards run a version of BTOS.

BTOS Executive. See Executive.

BTOS status codes. BTOS status codes are numerical codes reported by the system software through the BTOS Executive and other facilities. These codes indicate the status of system operations.

BTOS workstation. A BTOS workstation refers to a Unisys model B24, B26, B27, B28, B38 or B39 workstation.

built–in disk device. A built–in disk device is a 37.5, 71.3, or 72.2 Mb, 5 1/4–inch hard disk drive, or a 135 Mb SMD disk device, housed in an XE master or MD3 enclosure and used for the mass storage of programs and data.

central processing unit (CPU). The CPU is the part of the computer, that performs most of the fundamental processing. In the XE master system, this term is sometimes used interchangeably with the term processor.

CFA Display Volume utility. The Cluster File Access (CFA) Display Volume utility is a system utility that lets you examine the volume name and access rights of the volumes available through CFA.

Checkerboarding. Checkerboarding is a disk situation in which the software assigned to the storage area does not make effective use of the available space and leaves gaps in the in-use store similar to that of a checkerboard.

CLI. See Command Line Interpreter.

cluster configuration. A cluster configuration is a local resource–sharing group of workstations consisting of a master and one or more cluster workstations. The operating system can execute in each cluster workstation and in the master workstation.

cluster file access. A set of installed system services that allows a cluster or a master workstation to access files on other cluster workstations within the cluster configuration and across the network.

cluster line. Cluster line refers to the RS–422 cluster communications port connection which allows workstations to communicate with the XE master.

Cluster Processor (CP). A cluster processor is a board in the XE master system that runs communications software and supports workstations, a parallel printer, and up to three RS-232-C serial devices.

cluster workstation. A cluster workstation is connected to a master workstation within a cluster configuration.

command. A BTOS command is the command name and command form used with the BTOS Executive. Each command invoked from the Executive causes a corresponding utility to run on a BTOS processor.

command file. A command file is a file created by the system administrator which contains a listing of the BTOS commands available to a specific user. The command file allows the system administrator to limit a user's access to selected commands.

command form. The command form is form associated with many BTOS commands in which a user specifies parameters that define how the command is to be executed.

Command Line Interpreter (CLI). The command line interpreter is an interface program that interprets statements and executes BTOS run files on XE master processors.

configuration file. Configuration files specify the characteristics of devices, such as parallel printers, serial printers, or other devices you connect to a workstation's communications ports.

CP. See Cluster Processor.

CPU. See central processing unit.

crash dump. A crash dump is a file that contains a copy of a processor's memory at the time of a nonrecoverable failure (crash). Such a file can be used by Unisys personnel to analyze the cause of a processor failure.

CRC. See Cyclical Redundancy Check.

customized mode. The customized mode is the state of the system when it is booted up using a customized set of system configuration files.

Customizer. In BTOS, customizer is a utility that allows a user to modify operating system parameters to make the operating system configuration better suited to the user's needs.

Cyclical Redundancy Check (CRC). A cyclical redundancy check is a method of data error detection in which a two–byte block check character is appended to the data block. This operation insures that the data is not corrupted and that corrupted data is detected. See also Error Correction Code.

cylinder. A cylinder is a set of tracks on a storage disk that can be accessed together as a unit.

DAM. See Direct Access Method.

data volume. A data volume is used for data and program storage.

debugger. A debugger is a program that aides in fixing errors (bugs) in programs. It allows you to examine and modify memory, to set and clear breakpoints, and to produce formatted displays of memory.

demand paging. Demand paging is a form of memory management that maintains onboard memory for only those parts of the program code and data required for execution.

device. A device is a physical hardware entity, such as a terminal, printer, tape drive, or other input/output unit.

Device Configuration file. A Device Configuration file provides information that the system needs to communicate properly with a device such as a printer.

Dialog Screen. The Dialog Screen is the top portion of the Software Installation Manager (SIM) screen. The Dialog Screen presents prompts, help messages, and installation status to you.

Direct Access Method (DAM). The direct access method is a file access method providing random and non–overlapped input or output of records.

directory. A directory is a related group of files on a volume. Directories are the second level of the BTOS three–level hiearchical file system.

directory password. A directory password protects a directory on a volume.

disk cartridge. A disk cartridge is a magnetic disk storage medium utilizing a hard disk enclosed in a portable cartridge. Disk cartridges are used with a disk cartridge drive of an XE master base enclosure.

disk device. A disk device is a hardware component that is used to store data. An XE master disk device may be either a disk cartridge, a built–in disk (that is, a 5 1/4–inch hard disk controlled by a File Processor), or a Storage Module Device (SMD) disk.

disk extent. The disk extent is one or more contiguous disk sectors that contain all or part of a file.

disk fragmentation. See fragmentation.

disk initialization. See volume initialization.

Disk Processor (DP). The disk processor is a board in an XE master. The DP supports I/O to half–inch magnetic tape drives and SMD disks.

DP. See Disk Processor.

$directories. When BTOS receives a request with the directory $, the directory name is expanded to $nnn. (nnn represents the application user number.)

ECC. See Error Correction Code.

Editor. The Editor is an application that allows you to edit text using the keyboard. The text appears on the screen as it would on a typewritten page. You can activate the Editor with the EDIT command.

Error Correction Code (ECC). The error correction code is a method of detecting and correcting data errors on data that is read from a disk. ECC is a four–byte block check character appended to the data block that allows corrupted data bits to be identified and corrected.

error message. An error message appears when an error occurs in the file management system or a subsystem.

Executive. The Executive is an interactive BTOS application through which the various BTOS utilities can be executed through command forms.

exit run file. An exit run file is a user–specified file that the system loads and activates when an application system exits. Each application partition has its own exit run file.

field. A field is an area of a command form in which you enter parameters.

file. A file is a document, program, or other set of related data stored as a unit in a directory on a single volume.

file name. A file name is a unique name which identifies the contents of a file. It can contain a maximum of 50 alphanumeric characters including uppercase and lowercase letters, periods, hyphens, and right angle brackets (>).

File Processor (FP). The file processor is a board in an XE master system that supports I/O operations to disk devices.

File Protection utilities. File Protection utilities are offered through BTOS II 3.0 (or higher) and include the Undelete and Scrub utilities. Undelete allows you to recover a previously deleted file; Scrub allows you to completely erase file information from a volume.

FP. See File Processor.

file specification. A complete file specification has the form [VolumeName] < DirectoryName > FileName.

file system. A file system is a collection of files that are stored on the same logical disk device. A BTOS file system is made up of a three–level hierarchy that includes a volume, directories, and the files contained within each directory.

floppy disk drive. A floppy disk drive is a mass storage device that uses a flexible mylar disk coated with a suitable substance to record information in the form of electromagnetic signals.

Fragmentation. Fragmentation is a disk situation in which mass storage has many separate holes, or available spaces, and needs compacting.

Function key display. The Function Key display is a highlighted field, divided into ten sections corresponding to the ten variable function keys. The function key labels appear in reverse video indicating the operation each key performs. function key display

hard disk. A hard disk is a mass storage device that has very light read/write heads and very close head–to–disk clearance. Its storage medium is a rigid disk enclosed in a dust–free environment to achieve high information density and fast access time.

hexadecimal values. Hexadecimal values are used in the notation system of representing numbers in base 16.

home directory. Home directory is the directory into which the user is automatically placed when he or she logs onto the system.

ICC. See Inter–CPU Communication.

image mode. Image mode is a printing mode option that prints the banner page and recognizes the escape sequences for manual intervention. It does not perform character–code conversions.

Indexed Sequential Access Method (ISAM). The indexed sequential access method is a programming tool that provides sequencing of file records on disk and direct access to those records using an index.

initialization. Initialization is a process performed at the beginning of a program to ensure that all indicators and constants are set to prescribed conditions and values before you use the program.

initialization files. Initialization files contain prescribed indicators, constants, and values that you set for a particular program (for example, system services). BTOS reads intialization files during the beginning of the program's execution.

installable cluster communication. Installable cluster communication consists of a cluster communication run file, ClusterService.Run, that is loaded during system boot onto Protected Mode master workstations. The file enables the master to communicate with its cluster workstations.

installation logs. Installation logs are logs that provide a record of software installation operations.

Inter–CPU Communication (ICC). Inter–CPU Communication is the Intercommunications protocol used by XE master processors when communicating across the system bus.

I/O. Input/output.

I/O device configuration files. I/O device configuration files define the hardware and software parameters of disk drives, printers, tape drives, and communications devices such as modems and RS–232–C serial terminals.

ISAM. See Indexed Sequential Access Method.

ISAM server. ISAM server is the application that manages the execution of ISAM–related operations on a BTOS processor.

JCL. See Job Control Language.

Job Control Language (JCL). Job control language are statements submitted to CLI for batch execution.

kb. See kilobit.

kB. See kilobyte.

kilobit. A kilobit is 1024 bits.

kilobyte. A kilobyte is 1024 bytes.

language development software. Language development software are the software tools that support BTOS programming languages.

.lib. .lib is the standard file name suffix for library files.

log file. A log file is a file in BTOS, which contains a record of operations performed by BTOS processors.

master commands. Master commands are a set of BTOS commands, executed from the Executive, which invoke the corresponding utilities that run on an XE master processor. See utilities.

master configuration file. The master configuration file is a configuration file used by the master processor (FP00 or DP00) to determine the processor operating systems to be loaded at boot time.

master processor. The master processor is the first processor in the XE master system. This processor is loaded with the master BTOS operating system when the system is started. The master processor then controls the loading of the other processors with their operating systems. It also manages the system's interface with the base enclosure front panel controls.

master workstation. A master workstation is the hub of a cluster configuration. It provides a file system, queue management facility, and other services to all the cluster workstations. In addition, it supports its own interactive and application systems.

Mb. See megabyte.

mBTOS CONFIG utility. mBTOS config utility is a BTOS utility that allows a user to create or modify the master configuration file, processor initialization files, and processor configuration files.

mCommands. See master commands.

MD3. See Multidisk 3.

ME. See Memory Expansion Board.

megabyte. A megabyte is 1,024,000 bytes.

Memory Expansion (ME) Board. A memory expansion board is attached to a processor board to supply additional processor memory capacity.

menu. In BTOS, a menu is a terminal screen that provides a listing of operations from which a user selects to execute the desired operation.

Menu Screen. The Menu Screen is the bottom portion of the Software Installation Manager (SIM) screen. The Menu Screen displays lists of utilities and files. You select the items you want installed from the lists. Once SIM begins installing the selected software, it lists files that are being copied onto your hard disk in the menu screen.

mouse device. A Mouse device is available for use with the K2, K3 and K5 keyboards. You can use it to simulate keys in two ways: with two buttons and through table–top movements.

Multidisk 3 (MD3). A Multidisk 3 is a freestanding enclosure supporting up to three 135 Mb (formatted) SMD disk drives.

node. A node is the name of a workstation within a communications network. A node must have the communications software installed.

normal mode. Normal mode is an XE master operating mode that exists when the keyswitch is turned to NORMAL and the system is booted up using the default set of system files.

null string. A null string is a sequence of blank characters that usually does not change the default condition set up in the original BTOS command or submit file.

.obj. .obj is the standard file name suffix for object module files.

operating mode. The XE master's operating mode is determined by any one of four sets of system configuration files and BTOS processor versions used to boot up the XE master. The particular set of system configuration files used during boot–up time depends on the keyswitch position.

operating system. The operating system is the part of the system software that supervises the running of individual programs. Its functions include loading programs, allowing concurrent operation of two of more programs, scheduling processes within the system, and providing management of information. The operating system is sometimes referred to as the system image.

parameter. A parameter is a variable or constant that is transferred to or from a subroutine or program. You enter parameters in the fields of Executive command forms.

parameter passing. Parameter passing occurs when the system passes parameters specified in the SUBMIT command form to the submit file where they replace the escape sequences in the designated fields.

partition. A partition is an assigned area of the BTOS processor's memory. A program being run by the processor can be assigned a partition in which to execute. The program restricts its instruction and data to this assigned area of memory. This allows the processor to operate in a multitasking mode, in which several programs are running on the processor at the same time. Each program is actually sharing processing time on the processor. See primary partition and secondary partition.

password. A password is a string of characters used as part of the BTOS file security system. A password can be assigned to a user, device, volume, directory, or file. Once passwords are assigned (at least a volume and directory password) and a protection level is assigned to a file, a user must enter the correct password to gain access to that file, depending on the protection level.

path name. The path name is the full description that identifies a file's position in the file system. It includes a file's volume name, directory name and file name.

port. The port is the part of a processor dedicated to a single data channel for receiving data from, or transmitting data to, one or more external remote devices.

primary partition. A primary partition is an assigned area of a processor's memory that is established during system start up. Services that require user interaction and some system services must be run in the primary partition. There is only one primary partition per processor. See partition.

printer spooler. A printer spooler is a utility that allows printing tasks to be queued on a disk device and then automatically sent to an available printer, thus allowing a user to execute other applications from his or her terminal.

printer spooler manager. A printer spooler manager is a system service that manages the transfer of data from disk files to printers.

printer translation file. In BTOS, the printer translation file is used to translate characters in a text file into different characters or printer control sequences as the text file is printed.

process. A process is a program that is running.

processor configuration file. The processor configuration file is a file that defines the hardware and software configuration associated with a processor board.

processor initialization file. The processor initialization file is a file that defines the system services that are to be run on a processor when the system is started up.

product content file. The product content file is a file containing entries for each new software product that is stored on a release disk cartridge. This file provides the Boot Load and MSysload utilities with instructions on how to load the product.

protection level. The protection level is a decimal value assigned to a file that determines the type of password, if any, that a user must enter to gain read or write access to that file.

QIC server. QIC server is an application that controls the execution of I/O operations to a QIC tape drive.

QIC tape. See quarter–inch cartridge tape.

quarter–inch cartridge (QIC) tape. Quarter–inch cartridge tape is a magnetic tape storage medium that utilizes quarter–inch–wide tape contained in a hard plastic cartridge.

Queue.index file. Queue.index file is a file that defines the queues for which the Queue Manager is responsible.

Queue Manager. Queue manager is a BTOS system service that controls the various queues in which related tasks are stored for processing. For example, the Queue Manager controls the queues that are used to handle print requests made through printer spoolers. It can also manage similar queues for data communications processes and user–defined processes.

RAM. See random–access memory.

random–access memory (RAM). Random–access memory is the onboard processor memory to which and from which data can be written and read nonsequentially.

read–only memory (ROM). Read–only memory is the onboard processor memory whose contents can be read but can be written only by special means. The ROM normally contains start–up programs, such as self–diagnostic tests.

recoverable. A recoverable system (or program) is one that restores itself to full operation from a breakdown due to a failure in processing or equipment.

register. Register is a temporary memory location for data.

release medium. In BTOS, the release medium is a floppy disk on a workstation or a disk cartridge, QIC tape, or half–inch tape on an XE master on which Unisys release software is stored.

restore. Restore is the procedure by which archive files are written from an archive medium to an XE master volume.

restricted mode. The restricted mode is an XE master operating mode that is determined by the keyswitch setting of the XE master base enclosure. When set to REMOTE, the system reads the set of system configuration files that contain the identifying character.

reverse video. Reverse video displays dark characters on a light screen.

ROM. See read–only memory.

RS–232–C. An RS-232-C designation refers to an industry specification developed to standardize the interface between different types of communications equipment.

RS–422. An RS-422 is a high–speed communications standard used in an XE master system to link cluster workstations.

.run. .run is the standard file name suffix for run files.

run file. A run file is a complete program: a memory image of a task in relocatable form, linked into the standard format BTOS requires.

run statement. A run statement is a line of text that can be included in a JCL file for execution on a processor by the CLI.

screen attributes. Screen attributes control the presentation of characters on the screen.

sector. A sector is the smallest addressable portion of a track or band on a hard or floppy disk. See block.

secondary partition. A secondary partition is an assigned area of an XE master processor's memory in which applications, including some system services, that do not require user interaction can be run.

Selective backup. Selective backup is the process of copying selected files to an archive file. You implement this process with the SELECTIVE BACKUP command.

SIM. See Software Installation Manager.

signon file. A signon file is a file required for each user that enables the user to log into the system. The file also defines the user's password, the BTOS commands the user can access, the path (volume and directory) a user will be placed after signing on, and the application a user will enter.

SMD. See Storage Module Device.

Software Installation Manager (SIM). SIM is an installation program that lets you select the software you want installed at the beginning of the installation process. SIM lets you select utilities from a list, prompts you to insert disks (by the identification numbers), and describes the progress of installation operations as they occur.

SP. See Storage Processor.

special file. See device file.

spooler. See printer spooler.

spooler configuration file. A spooler configuration file is a file containing information that the system uses to coordinate print operations between the spooler and the queue manager.

Status Area. The Status Area is the top two lines of the screen in the Executive level, which provides continuously updated information about the system status.

status codes. See BTOS status codes.

Status Codes Reporter. The Status Codes Reporter is a system utility that allows you to interpret error codes that the system reports. You specify status codes by number, number ranges, or by strings in the Code Description Field; the utility displays messages that describe the corresponding numerical code.

STATUS display. The status display is the display on the XE master base enclosure's front panel through which the status of software installation, system start–up operations, and error conditions are reported.

Storage Controller (SC). The storage controller is a board used with SP to form DP, which controls SMDs.

Storage Module Device (SMD). The storage module device is a 133 Mb (formatted) Memorex 166 disk drive.

Storage Processor (SP). The storage processor is a processor board in the XE master system that controls half–inch magnetic tape.

subcommand. A subcommand appears within the operational procedures of a command and makes available an additional operation.

submenu. A submenu is a menu that appears when you make a selection from a main menu.

submit file. In BTOS, a submit file causes a series of BTOS utilities to be executed.

surface test. A surface test is a disk initialization operation that checks for bad spots on a disk that is accomplished by writing data to and then reading the data from each sector of the disk.

Sys.cmds. The Executive Command file ([Sys]<Sys>Sys.cmds) contains information on each Executive command.

system administrator. The system administrator is the person responsible for planning, generating, extending, and controlling the use of the operating system to improve the overall productivity of the installation.

system build. System build is the collective name for the sequence of actions necessary to construct a customized BTOS image.

system bus. The system bus is the path over which the system processors communicate.

system configuration files. System configuration files are text files that define the XE master BTOS hardware and software configuration.

system crash status words. System crash status words are normally displayed at the terminal screen and entered in the system log after a system crash occurs. System crash status words are useful when isolating the cause of a system crash.

system directory. The system directory <Sys> of each volume contains entries for all the system files. You create this directory with the IVOLUME command.

system disk. In BTOS, the system disk is the disk on which the XE master system software is installed. The system disk is normally either built–in disk d1 (for systems with a master FP) or SMD disk s0 (for systems with a master DP).

system image. The system image is the run file for an operating system.

system log. The system log is a log, displayable through the PLOG command, that contains a detailed account of system status, errors, and failures.

system partition. The system partition contains BTOS and dynamically installed system services.

system service. A system service is an operation performed by a system service process.

system service process. A system service process is an operating system process that services and responds to requests.

system volume. The operating system boots up from the system volume [Sys]. The <Sys> directory of the system volume contains entries for system files that are not necessary in the <Sys> directories of other volumes. You must place these additional entries in [Sys]<Sys> when you initialize the volume.

tape server. The tape server is an application that controls the execution of I/O operations to a half–inch tape drive.

task. A task consists of executable code, data, and one or more processes.

Temporary Directory Filter. A temporary directory filter is a system service in XE master BTOS that causes all temporary files, regardless of what application created them, to be stored in one directory on an XE master volume.

terminal. A terminal is a device, usually equipped with a keyboard and a display, which is capable of sending and receiving information over a communication channel.

Terminal Processor (TP). The terminal processor is a processor board in an XE master system that supports a parallel printer and up to ten RS–232–C serial devices.

text file. A text file contains bytes that represent printable characters (such as letters, numbers, and punctuation) and/or control characters (such as tab, new line, etc.).

TP. See Terminal Processor.

user command file. A user command file is a file in BTOS that contains all of the BTOS commands to which a user may have access. A command file entry in a user's signon file defines the command file accessible to the user.

User Control Block. The User Control Block (UCB) contains the default volume, directory, password, and file prefix set by the last PATH or SET FILE PREFIX operation.

user file. A user file is a file on the system directory that identifies the user and specifies the environment the system activates after the user signs on and exits from an application.

utility. A BTOS utility is a program that may be invoked by executing a command from the Executive or by executing a utility's run file through the Command Line Interpreter (CLI) using Job Control Language (JCL).

VHB. See Volume Home Block.

volume. In BTOS, volume is the complete file system unit of information stored on a formatted disk.

volume fragmentation. Volume fragmentation is the scattering of disk extents available for data storage. A volume is said to be fragmented if the system must allocate two or more smaller disk extents that have a total size sufficient to fulfill a data storage request. See disk extent.

Volume Home Block (VHB). Volume home block is an area on a volume that contains the volume name, the date it was created, the date it was last modified, and the number of free pages and file headers.

volume initialization. Volume initialization is the procedure performed by the mIVOLUME utility in which an XE master disk is prepared for use as a system volume. Among other tasks, this procedure formats the disk surfaces, performs read/write tests, writes volume control structures, and creates system files.

volume password. A volume password protects a volume. A volume must have a password for directory or file passwords to take effect.

wildcard character. The BTOS system allows two wildcard characters to be used in command form fields: an asterisk (*) and a question mark (?). The asterisk represents any string of characters; the question mark represents any individual character. Some operations allow you to use wildcard characters in file specifications. The system then tries to match the portion of the name that appears before or after the wildcard character and performs the requested operation for each matched file name.

X, Y, Z blocks. X, Y, Z blocks are operating system parameters that control the number and size of cluster communication blocks.

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